

**NASA TECHNICAL  
MEMORANDUM**

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**TRANSONIC WIND-TUNNEL TESTS OF AN F-8 AIRPLANE MODEL  
EQUIPPED WITH 12- AND 14-PERCENT-THICK OBLIQUE WINGS**

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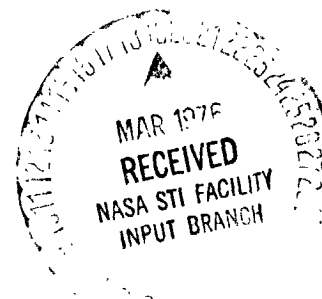
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## CONTENTS

	Page
SUMMARY .....	1
INTRODUCTION .....	1
NOMENCLATURE .....	
TEST FACILITY .....	
MODEL DESCRIPTION .....	4
TESTING AND PROCEDURE .....	5
RESULTS AND DISCUSSION .....	5
CONCLUDING REMARKS .....	7
REFERENCES .....	7
TABLES	
1. MODEL GEOMETRY .....	8
2. WING DIMENSIONAL DATA .....	9
3. TEST CONDITIONS .....	13
4. INDEX OF DATA FIGURES .....	14
FIGURES	
1. AXIS SYSTEMS .....	15
2. OBLIQUE-WING/BODY MODEL DETAILS AND PHOTOGRAPH .....	16
3. VARIATION OF MAXIMUM LIFT-TO-DRAG RATIO WITH MACH NUMBER FOR THREE WING SWEEP ANGLES .....	23
4. DATA .....	25

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TRANSONIC WIND-TUNNEL TESTS OF AN F-8 AIRPLANE MODEL  
EQUIPPED WITH 12- AND 14-PERCENT-THICK OBLIQUE WINGS

Ronald C. Smith, Robert T. Jones, and James L. Summers

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SUMMARY

An experimental investigation was conducted in the Ames 14-Foot Transonic Wind Tunnel to study further the aerodynamic performance and stability characteristics of a 0.087-scale model of an operational F-8 airplane fitted with an oblique wing. Two elliptical planform (axis ratio = 8:1) wings, each having a maximum thickness of 12 and 14 percent, were tested. All other external geometric features of the model were scaled to the basic full size airplane with the engine inlet faired closed.

Longitudinal stability data were obtained with no wing and with each of the two wings set at sweep angles of 0°, 45°, and 60°. Lateral-directional stability data were obtained for the 12-percent wing only. Test Mach numbers ranged from 0.6 to 1.2 in the unit Reynolds number range from 11.2 to 13.1 million per meter. Angles of attack were between -6° and 22° at zero sideslip. Angles of sideslip were between ±6° for two angles of attack, depending upon the wing configuration.

The lift-drag ratios for the 12-percent-thick wing indicate no performance penalty relative to a reference 10-percent-thick oblique wing and a small but significant penalty for the 14-percent-thick wing. The static longitudinal data show both configurations to be generally stable over the lift range of the investigation. The data indicate that the lateral-directional stability characteristics for the 12-percent-thick wing configuration are generally good.

INTRODUCTION

An experimental investigation was conducted in the Ames 14-Foot Transonic Wind Tunnel as part of a continuing study of the aerodynamic performance and stability characteristics of a 0.087-scale model of an operational F-8 airplane fitted with an oblique wing. In a previous investigation (ref. 1), this model was tested with a 10:1 (span-to-chord ratio) elliptic wing with 10-percent maximum thickness. This is the wing referred to by R. T. Jones in ref. 2. Preliminary design studies reported in ref. 3 indicated that the 10:1 wing was structurally heavy and that an 8:1 planform with between 12- and 14-percent maximum thickness would improve

overall performance. It is reported that a 14 percent-thick wing would be lighter and have a slightly higher cruise drag than a 12-percent-thick wing.

The present investigation was motivated by the need to define the performance and stability characteristics of the aircraft configuration with a structurally more efficient wing planform. In order to provide the drag data necessary for evaluating the weight-drag trade-off, two 8:1 elliptical wings having maximum thicknesses of 12- and 14-percent chord were built and tested. The center section airfoils were NACA 3612-02, 40 and NACA 3614-02, 40. All other external geometric features of the model were scaled to the operational airplane except the engine inlet, which was closed with a smooth fairing beginning ahead of the original nose station.

The tests reported herein were made over the Mach number range from 0.6 to 1.2 in the unit Reynolds number range from 11.2 to 13.1 million per meter. Six-component force and moment measurements were made on the model in pitch at zero sideslip for both wings set in three wing sweep positions and for one wing-off configuration. Additional measurements were made on the model with the 12-percent-thick wing in sideslip for two angles of attack typical of cruise flight.

A complete set of results are provided in this report with essentially no analysis.

#### NOMENCLATURE

The axis systems and sign conventions are shown in figure 1. Lift, drag, and pitching moment are presented in the stability-axis coordinate system and all other forces and moments are presented in the body-axis coordinate system. Because the data were computer-plotted, the corresponding plot symbol (where used) is given together with the conventional symbol.

<u>Symbol</u>	<u>Plot Symbol</u>	<u>Definition</u>
b		wing span
$C_D$	CD	drag coefficient, drag/qS
$C_L$	CL	lift coefficient, lift/qS
$C_{\ell}$	CBL	rolling-moment coefficient, rolling moment/qSb
$C_{m_i}$	CLM	pitching-moment coefficient, pitching moment/qSc <sub>root</sub>

<u>Symbol</u>	<u>Plot Symbol</u>	<u>Definition</u>
$C_n$	CYN	yawing-moment coefficient, yawing moment/ $qSb$
$C_y$	CY	side-force coefficient, side force/ $qS$
$c$		wing chord
$c_{root}$		wing root chord
$H$		vertical distance from wing reference plane to wing base line at $0.4c$
$(L/D)$	L/D	lift-drag ratio
$M$	MACH	free-stream Mach number
$q$		free-stream dynamic pressure
$S$		wing area
$t$		wing thickness
$x$		Cartesian coordinate
$Y-Lo$		maximum distance from wing base line to wing lower surface measured perpendicular to the wing base line
$Y-Up$		maximum distance from wing base line to wing upper surface measured perpendicular to the wing base line
$Z-Lo$		vertical distance from wing chord to wing lower surface
$Z-Up$		vertical distance from wing chord to wing upper surface
$z$		Cartesian coordinate
$\alpha$	ALPHA	angle of attack
$\beta$	BETA	angle of sideslip
$\Lambda$	LAMBDA	wing skew angle measured between a perpendicular to the body longitudinal axis and the 0.25 chord line of the wing in a horizontal plane

### Subscripts

max

maximum value

### Configuration Code

B <sub>2</sub>	B2	body with pointed inlet fairing
T	T	tail
W <sub>5</sub>	W5	wing with 12-percent maximum thickness
W <sub>6</sub>	W6	wing with 14-percent maximum thickness

### TEST FACILITY

The tests were conducted in the Ames 14-Foot Transonic Wind Tunnel which is a sea-level-density, closed-return, continuous-flow facility. This tunnel has an adjustable nozzle (two flexible walls) and a slotted test section to permit transonic testing over a Mach number range continuously variable from 0.6 to 1.2.

### MODEL DESCRIPTION

The model consisted of either of two elliptical planform wings mounted on top of the fuselage of a 0.087-scale model of an operational F-8 fighter type airplane as shown in fig. 2. Pertinent dimensions of the wing are shown in tables 1, 2 and in fig. 2. A photograph of the model mounted in the wind tunnel is shown in figure 2(g). The wing was pivoted in the horizontal plane about the 0.4 root-chord point to obtain angles of 0°, 45°, and 60°. The wings had an elliptical planform with an elliptic axis ratio of 8:1 (unswept aspect ratio of 10.2) and a straight 25-percent chord line. The wings had the airfoil sections NACA 3612-02, 40 and NACA 3614-02, 40 at the center, perpendicular to the unswept chord line. The maximum thickness varied along the span as shown in figure 2(f). The horizontal and vertical tail surfaces had NACA 65A006 airfoil sections and a 45° swept quarter-chord line. The horizontal tail was set at -1 1/2° incidence relative to the body center line. All external geometric features of the model, other than the wing, were 0.087 scale of the full size operational fighter-type airplane, except that the engine inlet was faired closed as shown in figure 2(a). Model body contours are shown in figure 2(b).

## TESTING AND PROCEDURE

The model was sting-supported through the base of the model body shown in figure 2(a) and force and moment data were obtained from an internally mounted six-component strain-gage balance. The moment center was located longitudinally at the wing pivot point ( $0.4c_{root}$ ) and 0.442 cm. above the model center line (fig. 2(a)). Tests were conducted at a atmospheric total pressure giving a unit Reynolds number range from 11.2 million to 13.1 million per meter over the test Mach number range from 0.6 to 1.2. Angle of attack ranged from  $-6^\circ$  to  $22^\circ$  at zero sideslip. Angles of sideslip were set between  $\pm 6^\circ$  for two angles of attack,  $3^\circ$  and  $5^\circ$ . These angles of attack correspond approximately to  $(L/D)_{max}$  for  $0^\circ$  and  $45^\circ$  sweep, respectively.

Six-component force and moment data were obtained for the wing at sweep angles of  $0^\circ$ ,  $45^\circ$ , and  $60^\circ$  rotated left wing forward.

Boundary layer transition was not fixed on the model. It is known from flow visualization studies made on the 12-percent-thick wing that natural transition occurred between 60- and 70-percent chord for  $\Lambda = 0$  and between 10- and 20-percent chord for  $\Lambda = 45^\circ$  and  $60^\circ$ .

The measured balance data were adjusted to a condition corresponding to free-stream static pressure on the model base. The Mach number range for each sweep angle tested is shown in table 3.

A complete index of the data figures is given in table 4.

## RESULTS AND DISCUSSION

### Lift-Drag-Ratio

The maximum L/D ratios for the two wings reported herein are summarized in fig. 3. The horizontal tail incidence used was  $-1\ 1/2^\circ$ , which trims the model at lift coefficients well beyond that for  $(L/D)_{max}$ . These L/D values then, while comparable with each other, are not comparable to those reported in ref. 1 which used zero tail incidence. Results of later tests made on the 12-percent-thick wing configuration with zero tail incidence are compared to the 10-percent-thick wing of reference 1 in figure 3(b). These data indicate no loss in  $(L/D)_{max}$  for the 12-percent, 8:1 wing. It is noted that the inlet fairings for the two sets of data are different, the ref. 1 fairing being somewhat blunter and resulting in higher drag at supersonic speeds. The reduction in the L/D due to increasing the wing thickness ratio from 0.12 to 0.14 is two units, about 10 percent, at  $M = 0.6$  and decreases with increasing wing sweep to 4 percent for  $\Lambda = 60^\circ$ . It thus appears that a 12-percent-thick wing



provides a definite aerodynamic advantage over a 14-percent-thick wing and that the structural benefit of a 14-percent-thick wing would have to overcome a significant performance penalty. It is known that the flow over the wing sections normal to the span axis is subcritical at  $M = 1.2$  for  $\Lambda = 60^\circ$  and therefore higher L/D ratios would be exhibited at Mach numbers up to 1.2 if a somewhat smaller sweep (e.g.,  $55^\circ$ ) had been used to provide higher aspect ratio.

#### Aerodynamic Characteristics in Pitch

The aerodynamic characteristics in pitch for the 12- and 14-percent-thick wings are plotted in fig. 4. The differences in aerodynamic characteristics other than drag and L/D are generally not large. There are, however, some differences in rolling moment for  $\Lambda = 45^\circ$  which appear to be related to nonuniform shock-induced separation, which become fairly large at  $M = 0.98$  and  $1.05$  (see fig. 4(f)). In practice, the wing sweep would be increased to avoid such separation. Also, the nonlinearities in the pitching moments are worse for the 14-percent-thick wing, indicating a stronger effect of the nonuniform separation.

Both configurations generally have adequate longitudinal static margin at all test Mach numbers for the chosen moment center location and are trimmed at lift coefficients between 0.5 and 0.8 with  $-1\ 1/2^\circ$  tail incidence.

The results for  $45^\circ$  and  $60^\circ$  sweep exhibit substantial rolling and yawing moment variations with changes in lift. These variations are typical of rigid oblique wings and should not be viewed as representative of flexible wing characteristics.

Wing-off - The aerodynamic characteristics in pitch for the wing-off configuration are plotted in fig. 5 for all eight test Mach numbers. These data have been reduced using the same reference lengths and area so that they may be used in combination with the fig. 4 data to estimate the wing contribution to the forces and moments.

#### Aerodynamic Characteristics in Sideslip

The aerodynamic characteristics in sideslip for the 12-percent-thick wing are plotted in fig. 6. The lateral-directional characteristics are essentially linear with sideslip except for cases where the flow over the wing is supercritical (e.g. see fig. 6(f));  $\Lambda = 45^\circ$ ). As in the case of the previously noted wing sweep effect on rolling moment, the cause appears to be related to nonuniform shock-induced separation.

The model has good directional stability and positive dihedral effect for all conditions for which the model was tested in sideslip. The model exhibits unsymmetrical lift and drag changes with sideslip which are typical for oblique wings. Such changes result from the unsymmetrical

changes in effective wing sweep angle due to sideslip.

#### CONCLUDING REMARKS

The lift-drag ratios measured on 12- and 14-percent-thick oblique wings indicate no performance penalty for the 12-percent wing and a small but significant penalty for the 14-percent-thick wing compared to the 10-percent thick, higher aspect ratio wing reported in reference 1. The model has adequate longitudinal and lateral-directional stability characteristics. Pitch-induced roll and yaw which are typical of rigid oblique wings are present throughout the data for 45° and 60° sweep. These moments however, should not be viewed as deleterious for a real airplane because of the large expected stable influence of wing flexibility on these moments.

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September 11 1975

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2. Jones, Robert T.: New Design Goals and a New Shape for the SST. Astronautics & Aeronautics, Dec. 1972, pp. 66-70.
3. Kuifan, Robert M.; et al: High Transonic Speed Transport Aircraft Study-Final Report. NASA CR-114658, Sept. 1973.

TABLE 1. - MODEL GEOMETRY

Wings	W <sub>5</sub>	W <sub>6</sub>
Planform	8:1 ellipse about c/4	
Span (reference)	136.30 cm	136.30 cm
Area (reference)	1823.87 cm <sup>2</sup>	1823.87 cm <sup>2</sup>
Root chord	17.04 cm	17.04 cm
Aspect ratio	10.2	10.2
Maximum t/c	0.12	0.14
Incidence	0°	0°
0.25c sweep	0°	0°
Section	NACA 3612-02,40	NACA 3614-02,40
Maximum thickness location	0.40c	0.40c
Loading-edge nose radius	0.0288c	0.0392c
horizontal tail		
Planform	trapezoidal	
Span	48.16 cm	
Area	333.55 cm <sup>2</sup>	
Root chord	23.80 cm	
Tip chord	3.56 cm	
Aspect ratio	6.95	
Maximum t/c	0.06	
Incidence	-1.5°	
0.25c sweep	45°	
Section	NACA 65A006	
Vertical tail		
Planform	trapezoidal	
Span	31.93 cm	
Area	697.42 cm <sup>2</sup>	
Root chord	34.80 cm	
Tip chord	8.90 cm	
Aspect ratio	1.46	
Maximum t/c	0.06	
0.25c sweep	52.5°	
Section	NACA 65A006	

TABLE 2. - WING DIMENSIONAL DATA<sup>a</sup>  
(a) 12-Percent-Thick Wing

Semi-Span	Chord	Z-Up	Z-Lo	H
0	17.038	1.491	0.650	0
2.54	17.028	1.488	.650	0.0025
5.08	16.992	1.483	.647	.013
7.62	16.931	1.476	.643	.025
10.16	16.848	1.465	.635	.048
12.70	16.741	1.450	.625	.076
15.24	16.606	1.430	.614	.109
17.78	16.449	1.409	.602	.152
20.32	16.264	1.384	.587	.200
22.86	16.053	1.356	.569	.259
25.40	15.811	1.323	.551	.322
27.109	15.634	1.300	.538	.368
28.877	15.433	1.272	.523	.421
30.503	15.237	1.247	.508	.475
32.009	15.042	1.222	.493	.523
33.409	14.851	1.199	.480	.574
34.722	14.661	1.176	.467	.622
35.954	14.475	1.150	.455	.670
37.114	14.290	1.127	.442	.716
38.214	14.109	1.107	.429	.762
39.253	13.929	1.084	.416	.805
40.244	13.751	1.064	.406	.848
41.183	13.576	1.041	.394	.891
42.080	13.403	1.021	.383	.932
42.936	13.233	1.003	.373	.972
43.754	13.063	0.983	.363	1.013
44.539	12.898	.962	.353	1.051
45.288	12.733	.945	.343	1.089
46.007	12.570	.927	.335	1.125
47.722	12.164	.881	.312	1.214
48.979	11.849	.848	.295	1.282
50.142	11.542	.815	.279	1.349
51.222	11.239	.785	.264	1.409
52.222	10.947	.754	.249	1.468
53.157	10.663	.726	.236	1.524
54.028	10.386	.698	.223	1.577
54.841	10.117	.673	.213	1.626
55.603	9.852	.647	.200	1.674
56.314	9.596	.625	.190	1.719
56.982	9.347	.602	.180	1.760
57.609	9.106	.579	.170	1.800
58.196	8.867	.559	.162	1.841
58.748	8.638	.538	.155	1.877

<sup>a</sup> All dimensions are centimeters

TABLE 2.(a). - Concluded.<sup>a</sup>

Semi-Span	Chord	Z-Up	Z-Lo	H
59.268	8.412	0.518	0.145	1.910
59.756	8.194	.500	.139	1.943
60.216	7.980	.532	.132	1.976
60.647	7.775	.467	.124	2.004
61.056	7.572	.449	.119	2.032
61.440	7.376	.434	.114	2.060
61.803	7.183	.419	.109	2.083
62.143	6.998	.406	.102	2.108
62.466	6.815	.391	.099	2.131
62.771	6.637	.378	.094	2.151
63.058	6.464	.366	.089	2.171
63.329	6.297	.353	.084	2.191
63.586	6.134	.343	.081	2.209
64.196	5.722	.315	.071	2.253
64.625	5.413	.292	.063	2.283
65.009	5.118	.274	.053	2.311
65.346	4.841	.256	.053	2.337
65.649	4.577	.239	.048	2.359
65.918	4.331	.223	.046	2.379
66.157	4.094	.211	.041	2.397
66.373	3.873	.198	.038	2.413
66.563	3.662	.185	.035	2.425
66.733	3.464	.173	.033	2.438
66.883	3.276	.162	.030	2.451
67.139	2.931	.145	.025	2.468
67.394	2.542	.124	.020	2.489
67.648	2.077	.099	.017	2.507
67.902	1.470	.071	.010	2.527
68.156	0	0	0	2.548

<sup>a</sup> All dimensions are centimeters

TABLE 2. - WING DIMENSIONAL DATA<sup>a</sup>  
(b) 14-Percent-Thick Wing

Semi-Span	Chord	Z-UP	Z-Lo	H
0	17.038	1.659	0.803	0
2.54	17.028	1.659	.800	0.0025
5.08	16.992	1.651	.797	.015
7.62	16.931	1.643	.789	.033
10.16	16.848	1.628	.782	.058
12.70	16.741	1.613	.772	.094
15.24	16.606	1.590	.757	.135
17.78	16.449	1.567	.742	.185
20.32	16.264	1.537	.723	.244
22.86	16.053	1.504	.701	.312
25.40	15.811	1.468	.678	.386
27.109	15.634	1.443	.663	.442
28.877	15.433	1.412	.645	.503
30.503	15.237	1.384	.625	.564
32.009	15.042	1.354	.609	.622
33.409	14.851	1.328	.592	.678
34.772	14.661	1.300	.574	.737
35.954	14.475	1.275	.559	.789
37.114	14.290	1.249	.543	.843
38.214	14.109	1.224	.528	.897
39.253	13.929	1.199	.513	.947
40.244	13.751	1.176	.500	.996
41.183	13.576	1.151	.585	1.044
42.080	13.403	1.128	.472	1.092
42.936	13.233	1.105	.459	1.138
43.754	13.063	1.084	.447	1.184
44.539	12.898	1.062	.434	1.227
45.288	12.733	1.041	.424	1.270
46.007	12.570	1.021	.411	1.310
47.722	12.164	.970	.383	1.415
48.979	11.849	.932	.363	1.491
50.142	11.542	.896	.343	1.565
51.222	11.239	.861	.325	1.636
52.222	10.947	.828	.307	1.702
53.157	10.663	.795	.292	1.765
54.028	10.386	.764	.277	1.824
54.841	10.117	.736	.262	1.882
55.603	9.852	.708	.249	1.935
56.314	9.596	.681	.233	1.986
56.982	9.347	.655	.223	2.034
57.609	9.106	.632	.211	2.080
58.196	8.867	.609	.200	2.123
58.748	8.638	.581	.190	2.164

<sup>a</sup> All dimensions are centimeters

TABLE 2.(b). Concluded.<sup>a</sup>

Semi-Span	Chord	Z-Up	Z-Lo	H
59.268	8.412	0.564	0.180	2.205
59.756	8.194	.543	.173	2.240
60.216	7.981	.526	.162	2.276
60.647	7.775	.505	.155	2.311
61.056	7.572	.487	.147	2.312
61.463	3.376	.469	.139	2.372
61.803	7.183	.455	.132	2.400
62.144	6.998	.439	.127	2.428
62.466	6.815	.424	.122	2.454
62.771	6.637	.409	.114	2.476
63.058	6.464	.396	.109	2.502
63.482	6.297	.381	.104	2.522
63.586	6.134	.368	.099	2.542
64.196	5.723	.338	.089	2.593
64.625	5.413	.315	.081	2.629
65.009	5.118	.295	.074	2.659
65.346	4.841	.274	.066	2.687
65.649	4.577	.265	.061	2.713
65.918	4.331	.241	.056	2.735
66.157	4.094	.226	.051	2.756
66.373	3.873	.211	.048	2.774
66.563	3.663	.198	.043	2.789
66.733	3.464	.185	.041	2.804
66.883	3.277	.175	.038	2.817
66.139	2.931	.155	.033	2.839
67.394	2.542	.132	.028	2.860
67.648	2.078	.107	.020	2.883
67.902	1.471	.074	.015	2.906
68.156	0	0	0	2.926

<sup>a</sup> All dimensions are centimeters

TABLE 2 - TEST CONDITIONS

Configuration	$\theta$ (deg)	Numbers										Schedule	
		0.60 11.2	0.70 11.8	0.80 12.5	0.95 13.1	0.98 12.8	1.05 12.5	1.1 12.1	1.2 11.8	Reynolds numbers (million/meter)		$\alpha$	$\beta$
W <sub>5</sub> B <sub>2</sub> T	0	x	x	x								-6 +22	0
	0	x	x	x								5	-6 +6
	45		x	x	x	x	x					-6 +15	0
	45		x	x	x	x	x					5	-6 +6
	45		x	x	x	x	x					3	-6 +6
	60			x	x	x	x	x	x			-6 +18	0
	60			x	x	x	x	x	x			5	-6 +6
	60			x	x	x	x	x	x			3	-6 +6
	60			x	x	x	x	x	x			-6 +22	0
W <sub>6</sub> B <sub>2</sub> T	0	x	x	x								-6 +22	0
	45		x	x	x	x	x					-6 +15	0
	60			x	x	x	x	x	x			-6 +18	0
B <sub>2</sub> T	-	x	x	x	x	x	x	x	x			-6 +20	0



TABLE 4. - INDEX TO DATA FIGURES

Figure	Title	Page
4	Aerodynamic characteristics in pitch; comparison of 12-percent and 14-percent-thick wings for wing sweep angles of 0°, 45°, and 60°.	
	Mach no. = 0.60	1
	.70	8
	.80	15
	.95	22
	.98	29
	1.05	36
	1.10	43
	1.20	50
5	Aerodynamic characteristics in pitch with wing off.	57
6	Aerodynamic characteristics in sideslip with the 12-percent-thick wing at 0°, 45°, and 60° of wing sweep and angles of attack of 3° and 5°	
	Mach no. = 0.60	71
	.70	78
	.80	85
	.95	92
	.98	99
	1.05	106
	1.10	113
	1.20	120

Note: Positive directions of force coefficients, moment coefficients, and angles are indicated by arrows.

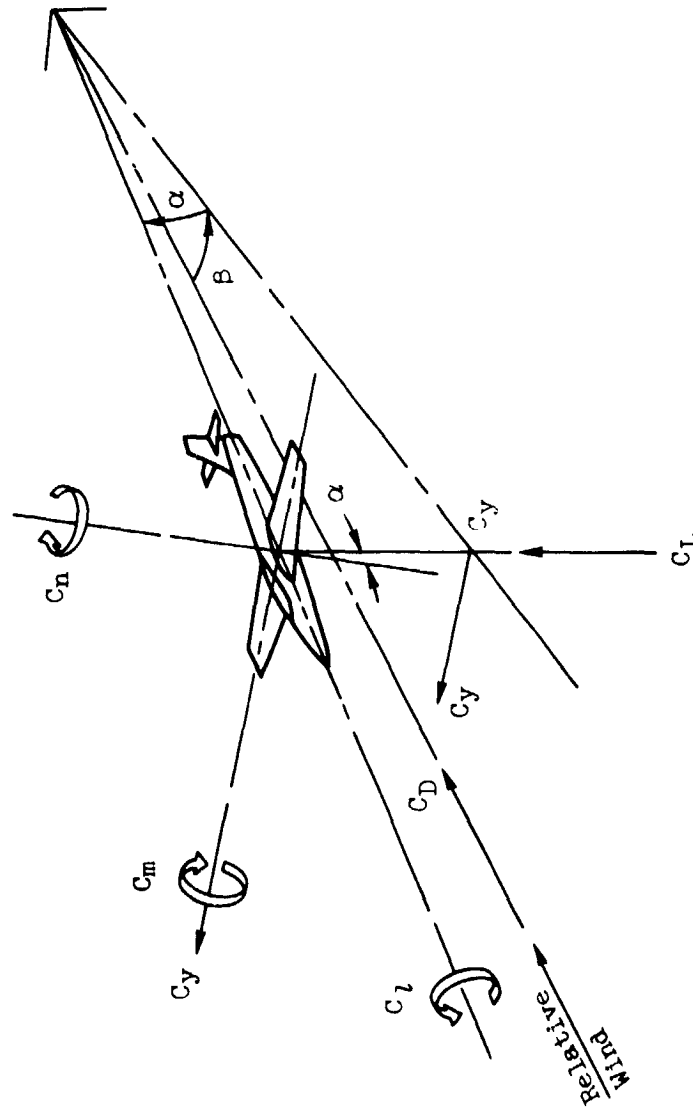
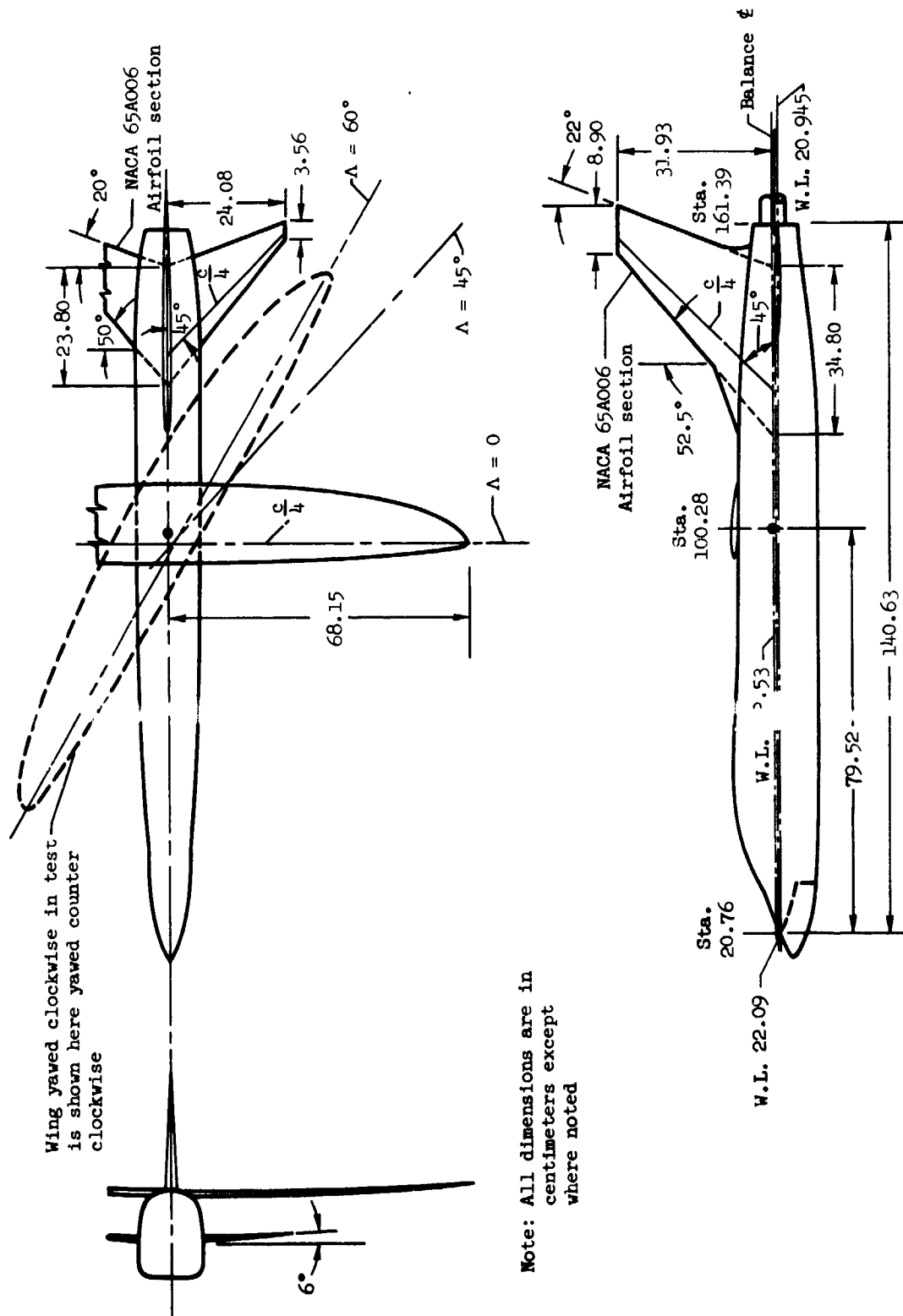
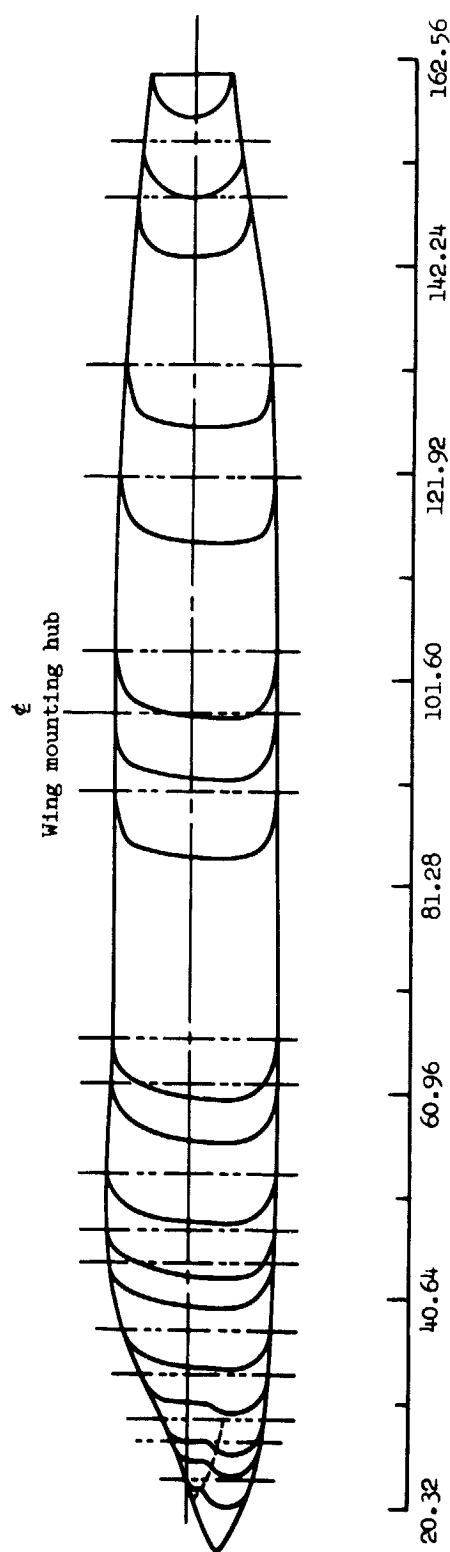
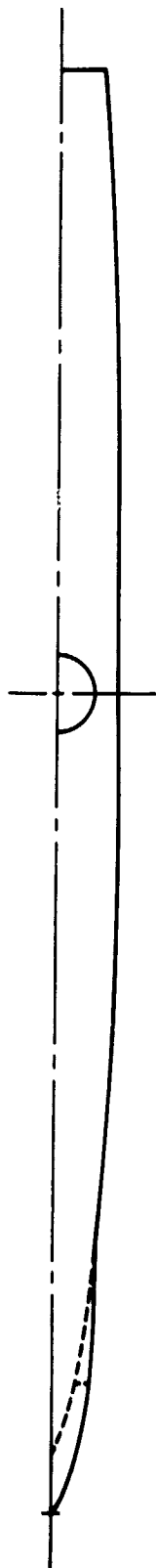


Figure 1. - Axis systems, sense of force and moment coefficients, angle of attack, and sideslip angle.



(a) Three-view

Figure 2.- Oblique-wing model details and photograph.

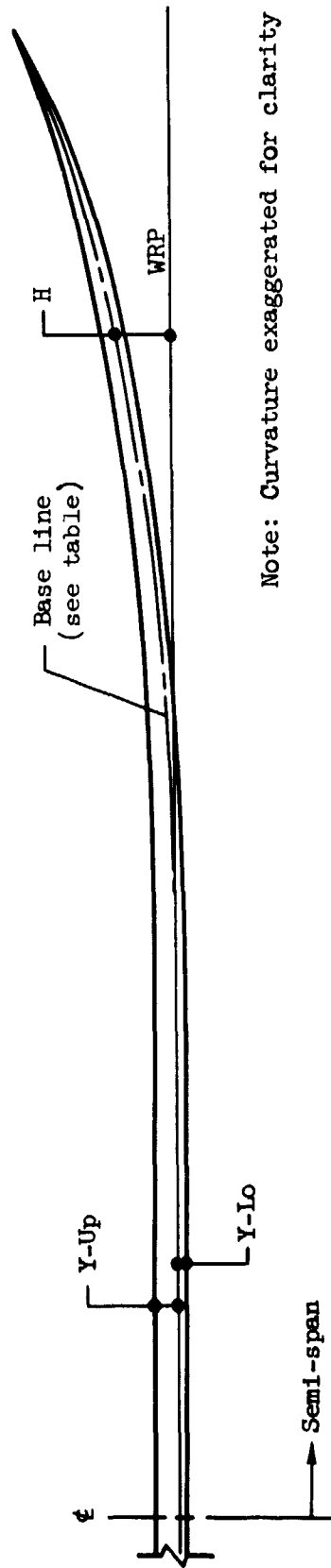


(b) Fuselage contours.

Figure 2.- Continued.

### (b) Fuselage contours

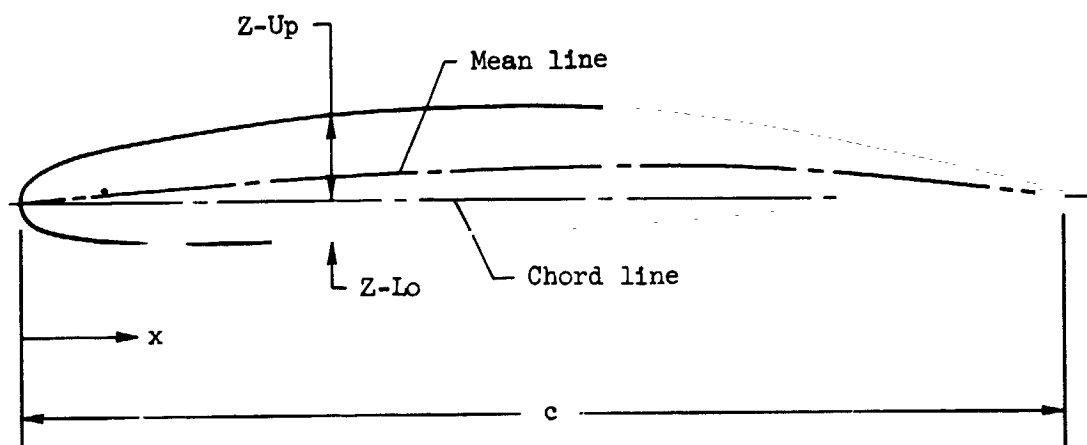
Figure 2. - Continued.



Note: Curvature exaggerated for clarity

(c) Wing curvature.

Figure 2. - Continued.

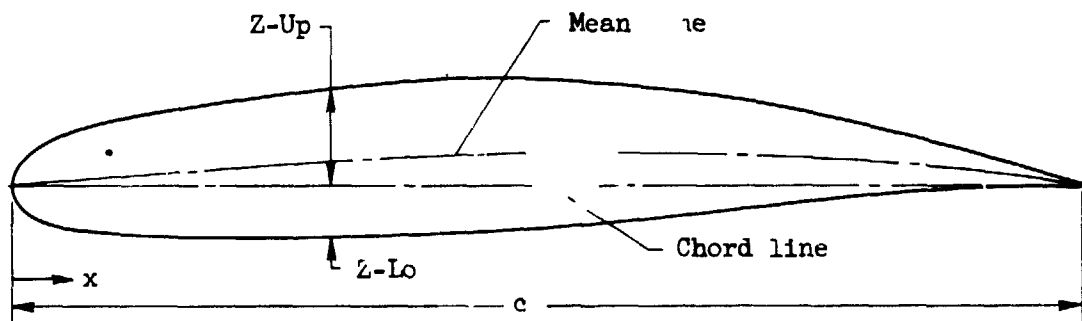


$x/c$	$t/c$	$\frac{\text{Camber}}{c}$	$\frac{Z\text{-Up}}{c}$	$\frac{Z\text{-Lo}}{c}$
0.001	.01444	.00008	.00730	-.00714
0.010	.04072	.00078	.02114	-.01958
0.025	.05819	.00195	.03104	-.02715
0.050	.07343	.00389	.04060	-.03282
0.075	.08269	.00582	.04716	-.03553
0.100	.08934	.00772	.05239	-.03695
0.150	.09899	.01144	.06093	-.03806
0.200	.10622	.01498	.06808	-.03813
0.300	.11625	.02129	.07942	-.03683
0.400	.11997	.02621	.08619	-.03378
0.500	.11571	.02925	.08711	-.02861
0.600	.10263	.02995	.08127	-.02136
0.700	.08144	.02785	.06856	-.01287
0.800	.05467	.02246	.04980	-.00487
0.900	.02687	.01334	.02677	-.00009
1.000	.00456	.0	.00228	-.00228

$$\frac{\text{L.E. radius}}{c} = .0288$$

(d) Wing section drawing and tabulated geometry at wing span station  
 $\eta = 0$ ; 12-percent thick wing,  $W_5$

Figure 2. - Continued.

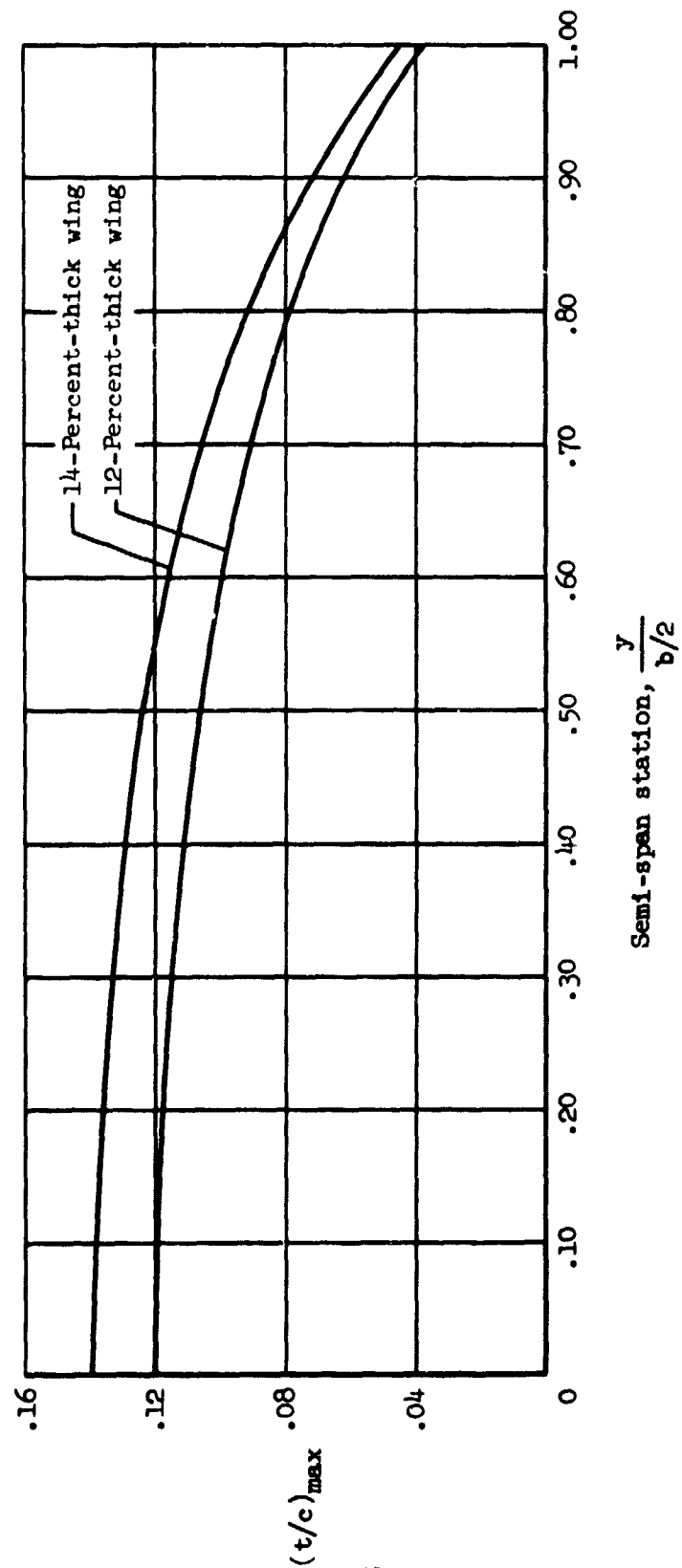


$x/c$	$t/c$	$\frac{d^2t}{dx^2}$	$\frac{z-Up}{c}$	$\frac{z-Lo}{c}$
0.001	.01685	.0000	.00850	-.00834
0.010	.04751	.0000	.02454	-.02298
0.025	.06789	.00195	.03589	-.03199
0.050	.08567	.00500	.04672	-.03894
0.075	.09647	.00700	.05405	-.04242
0.100	.10423	.00772	.05984	-.04440
0.160	.11549	.00714	.06918	-.04631
0.200	.12392	.01498	.07694	-.04698
0.300	.13562	.02129	.08911	-.04652
0.400	.13996	.02621	.09619	-.04377
0.500	.13500	.02925	.09675	-.03825
0.600	.11974	.02995	.08982	-.02992
0.700	.09501	.02785	.07535	-.01966
0.800	.06379	.02246	.05436	-.00943
0.900	.03134	.01334	.02901	-.00233
1.000	.00532	.0	.00266	-.00266

$$\frac{\text{L.E. radius}}{c} = .0392$$

(e) Wing section drawing and tabulated geometry at wing span station  $\eta = 0$ ; 14-percent thick wing,  $W_6$

Figure 2. - Continued.



(f) Wing maximum thickness distributions.

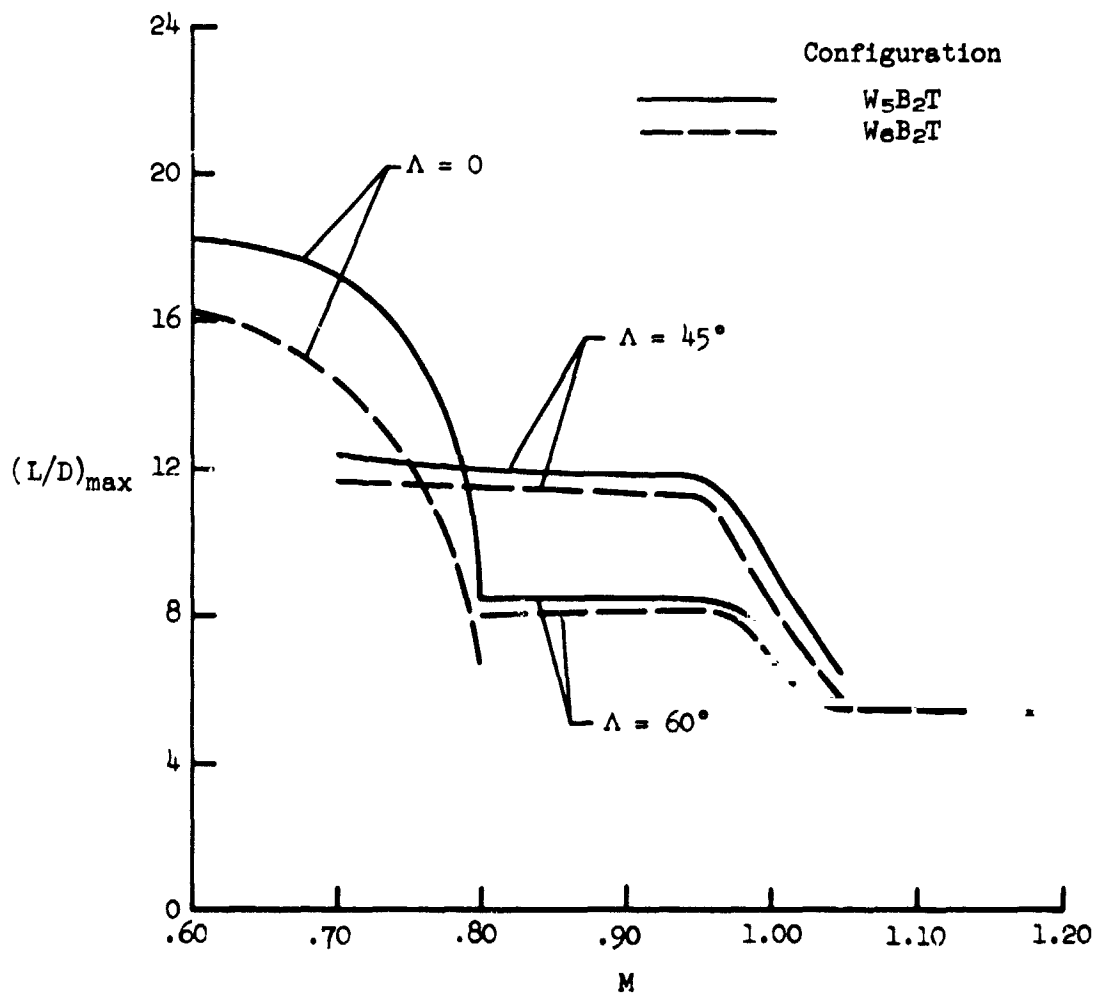
Figure 2. - Continued.



ORIGINAL PAGE IS  
OF POOR QUALITY

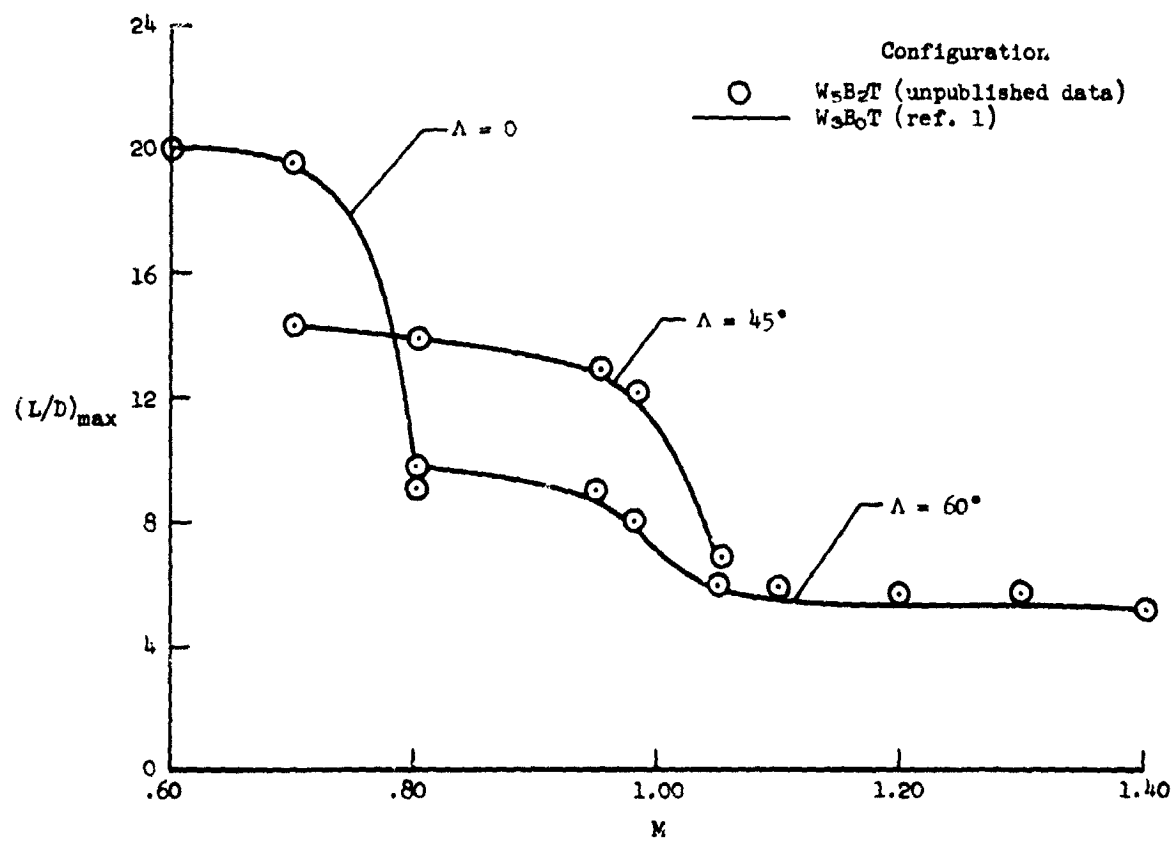
(g) Photograph of model in the Ames 14-Foot Transonic Wind Tunnel

Figure 2. - Concluded.



(a) Tail incidence =  $-1.5^\circ$ ;  $Re = 13.2 \times 10^6$  per meter

Figure 3. - Variation of maximum lift-to-drag ratio with Mach number for three wing sweep angles.



(b) Tail incidence =  $0^\circ$ ;  $R_e = 20.0 \times 10^6$  per meter

Figure 3. - Concluded.

DATA

DATA SET SYMBOL CONFIGURATION DESCRIPTION

VS 82 I  
 V6 BC  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 60.000 .000  
 60.000 .000

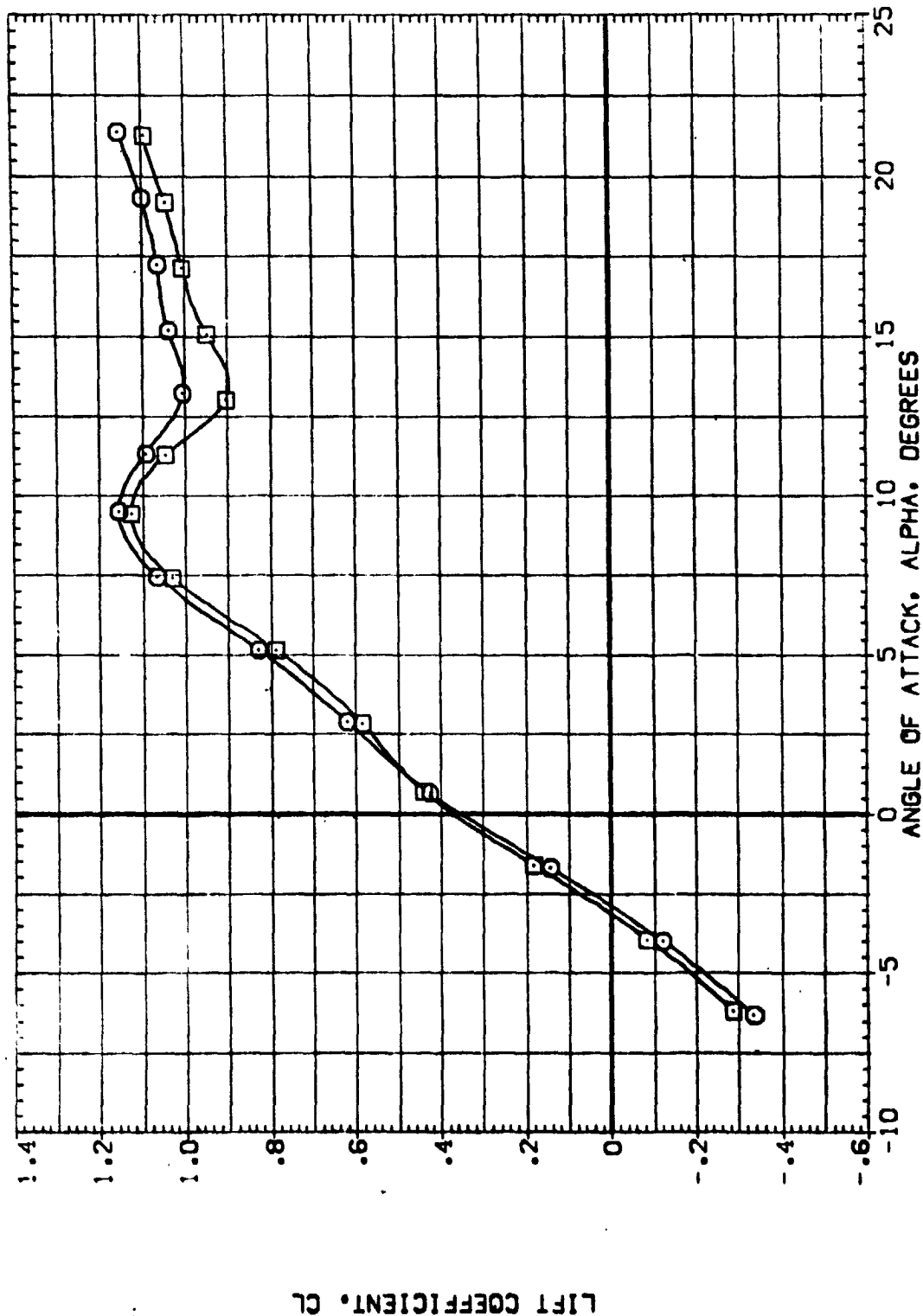


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(A)MACH = .60

PRECEDING PAGE BLANK NOT FILMED

LAMBDA	BETA
.000	.000
.000	.000
45.000	.000
45.000	.000
60.000	.000
60.000	.000

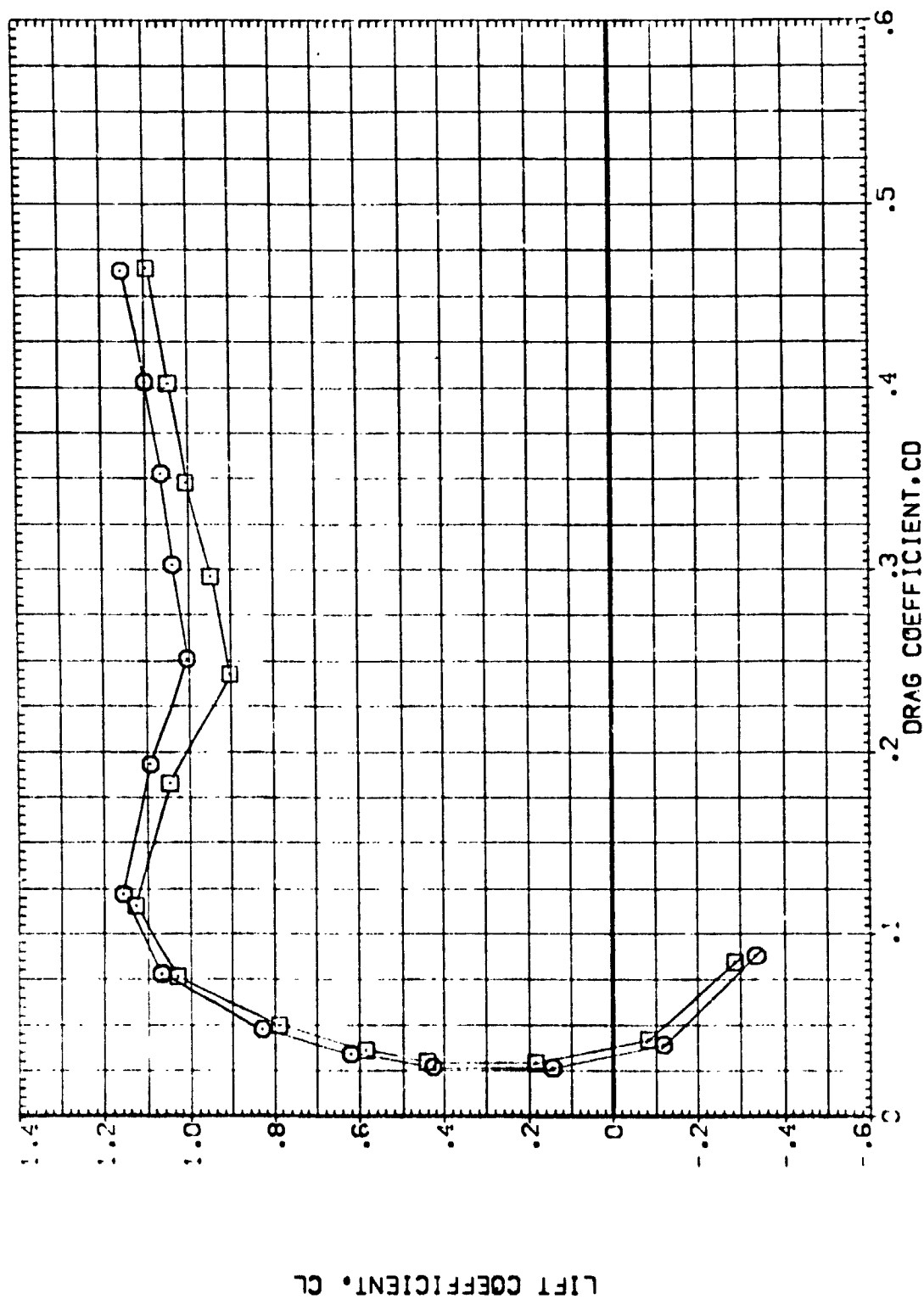


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

09. = 1344(Y)

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RE:001] V5 BC T  
 [RE:002] V6 BC T  
 [RE:003] DATA NOT AVAILABLE  
 [RE:004] DATA NOT AVAILABLE  
 [RE:005] DATA NOT AVAILABLE  
 [RE:006] DATA NOT AVAILABLE

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000  
 60.000 .000

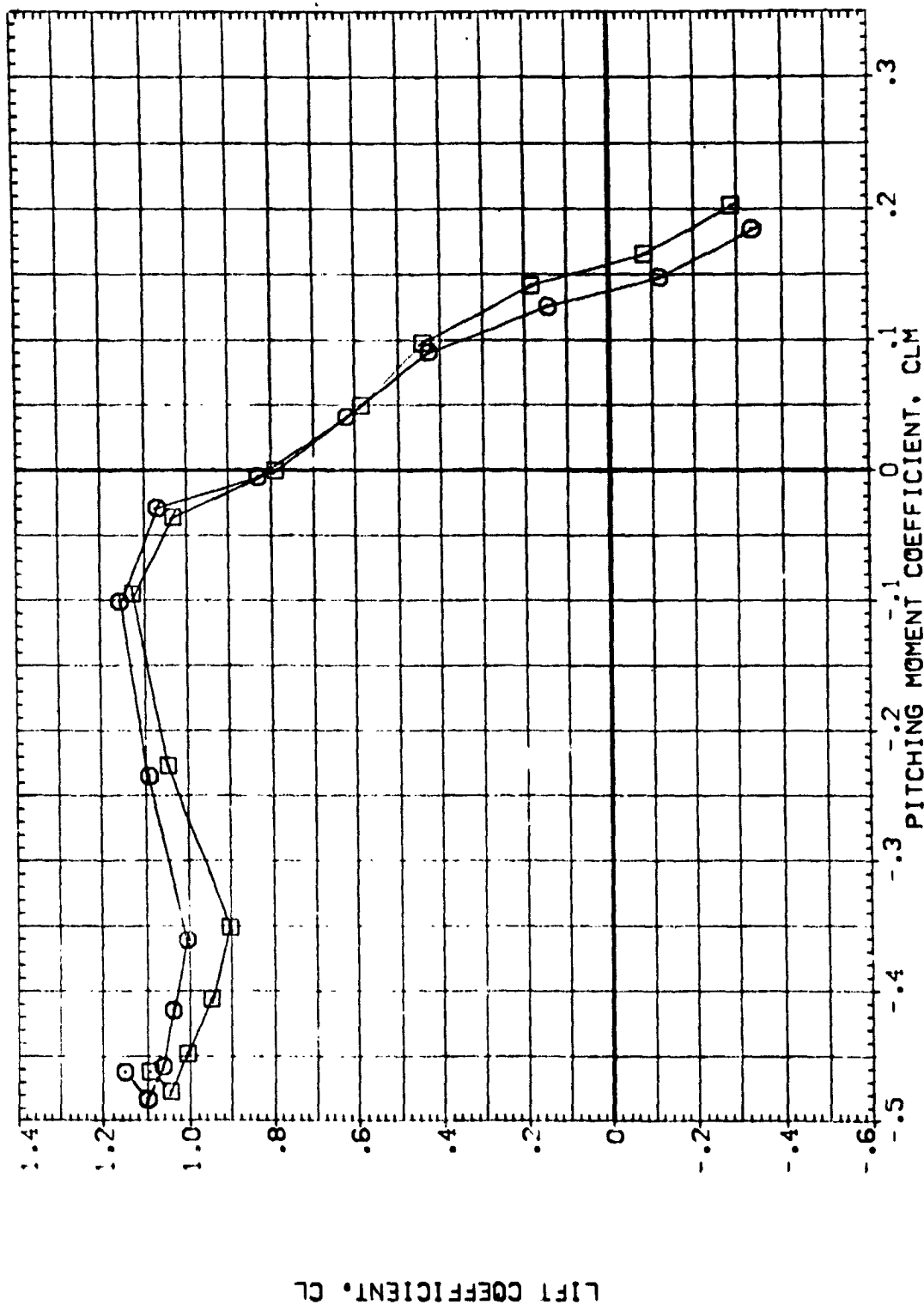


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.  
 (A)MACH = .60  
 PAGE 3

DATA SET SYMB  
 [RE:001]  
 [RE:002]  
 [RE:003]  
 [RE:004]  
 [RE:005]  
 [RE:006]

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000  
 60.000 .000

DATA NOT AVAILABLE  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE

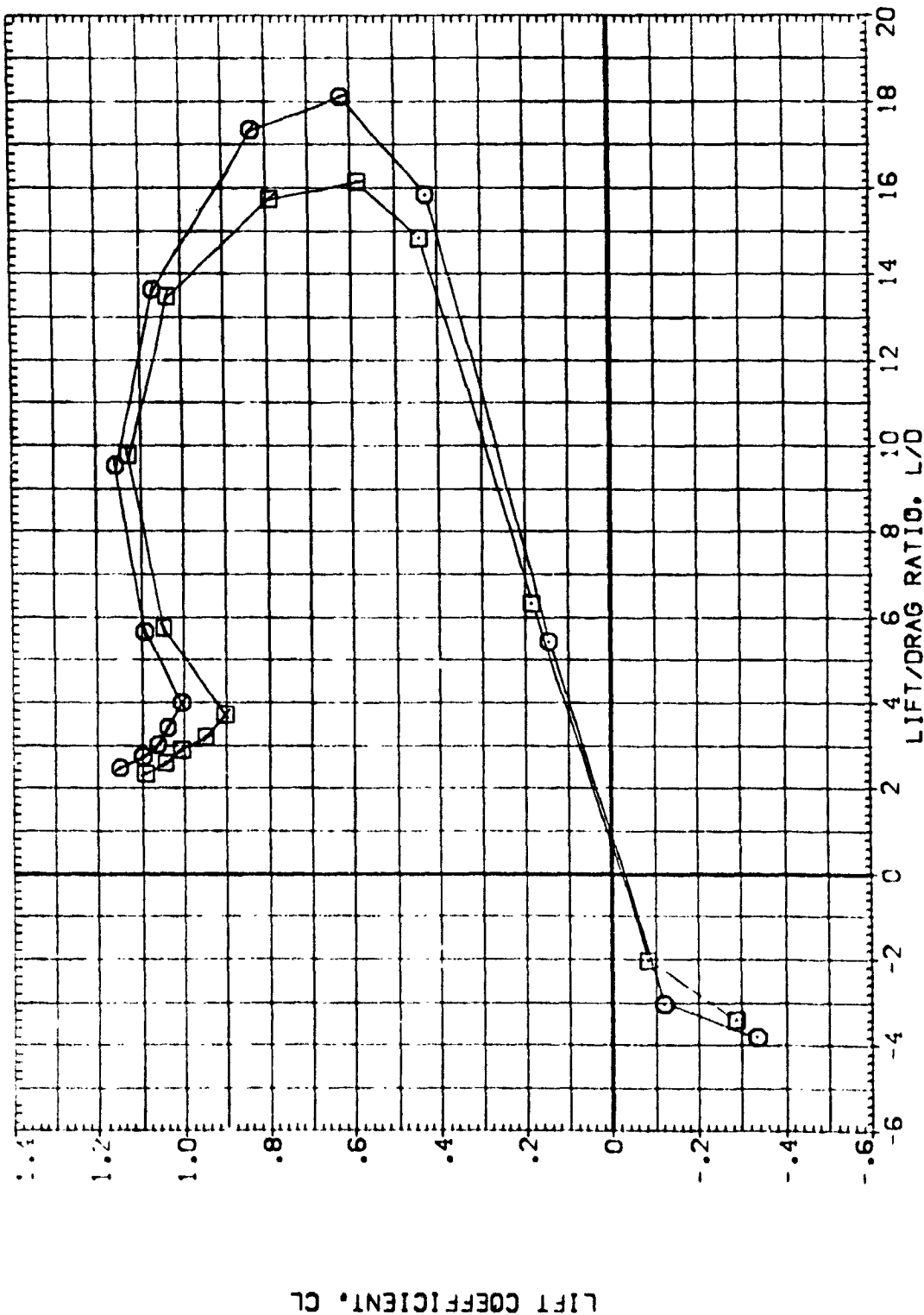


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(A)MACH = .60



DATA SET SYMOL. CONFIGURATION DESCRIPTION  
 (R#0001) V5 B2 T  
 (R#0002) V6 B2 T  
 (R#0003) DATA NOT AVAILABLE  
 (R#0004) DATA NOT AVAILABLE  
 (R#0005) DATA NOT AVAILABLE  
 (R#0006) DATA NOT AVAILABLE

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000  
 60.000 .000

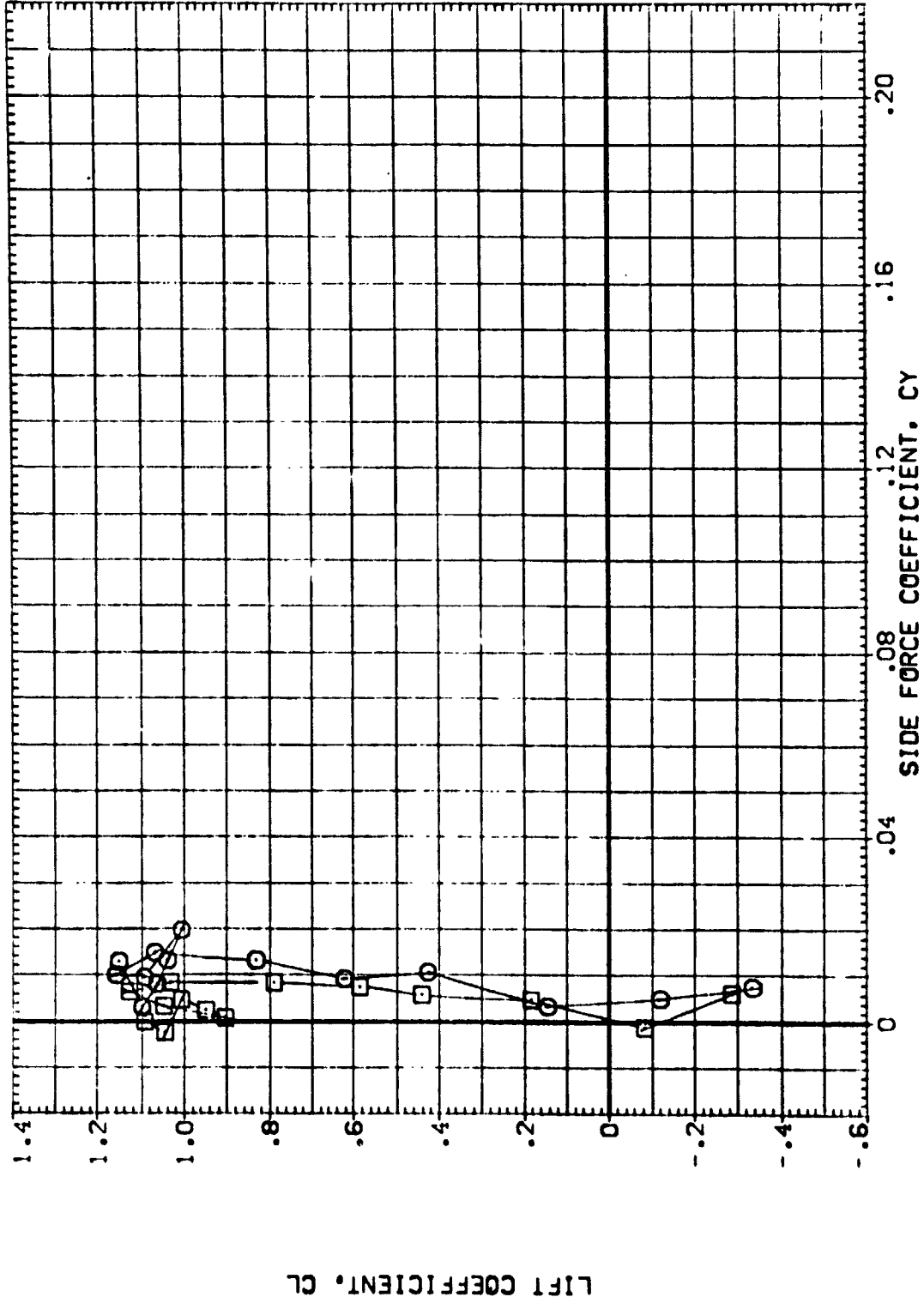


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(A) MACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 32 T  
 V6 B2 T  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000  
 60.000 .000

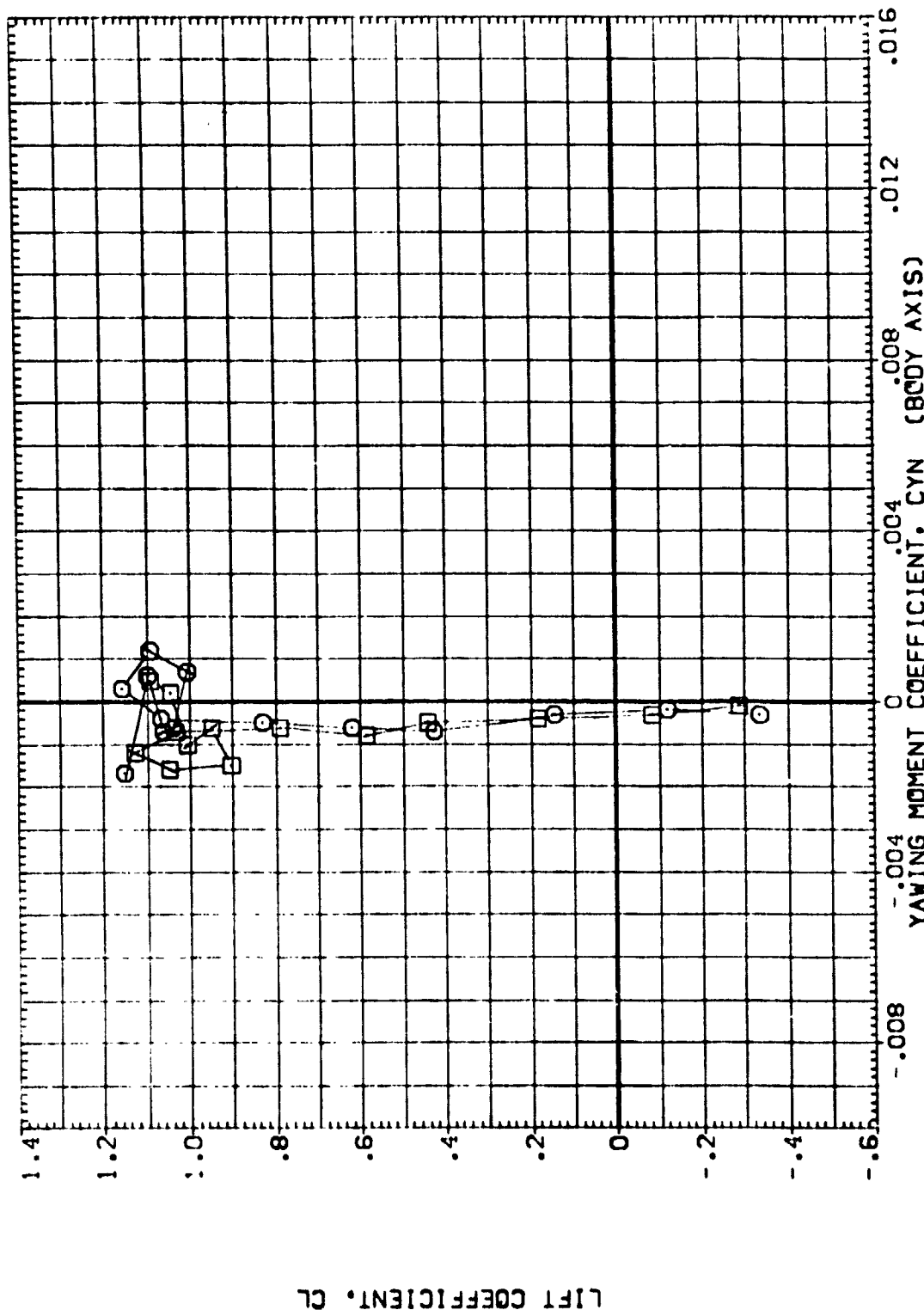


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.  
 (A) VACH = .60

DATA SET SYMBOL VS B2 T CONFIGURATION DESCRIPTION  
 [RE-001] 0 18 12 VS B2 T  
 [RE-002] 0 18 12 VS B2 T  
 [RE-003] 0 18 12 VS B2 T  
 [RE-004] 0 18 12 VS B2 T  
 [RE-005] 0 18 12 VS B2 T  
 [RE-006] 0 18 12 VS B2 T

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 60.000 .000

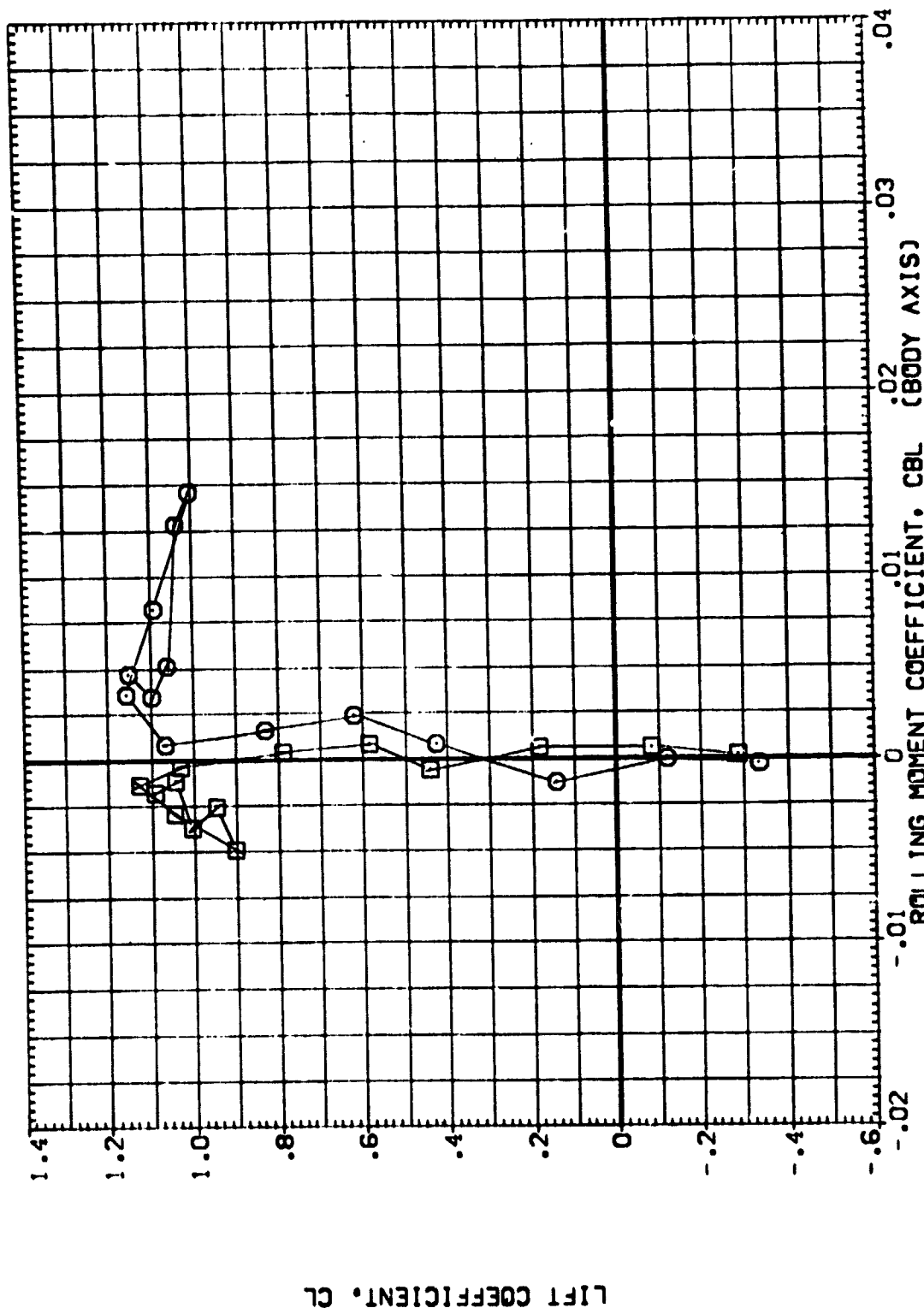


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.  
 (A)MACH = .60

DATA SET SYMBO. CONFIGURATION DESCRIPTION  
 [RE-J001] V5 B2 Y  
 [RE-J002] V6 B2 Y  
 [RE-J003] V5 B2 Y  
 [RE-J004] V6 B2 Y  
 [RE-J005] DATA NOT AVAILABLE  
 [RE-J006] DATA NOT AVAILABLE

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000

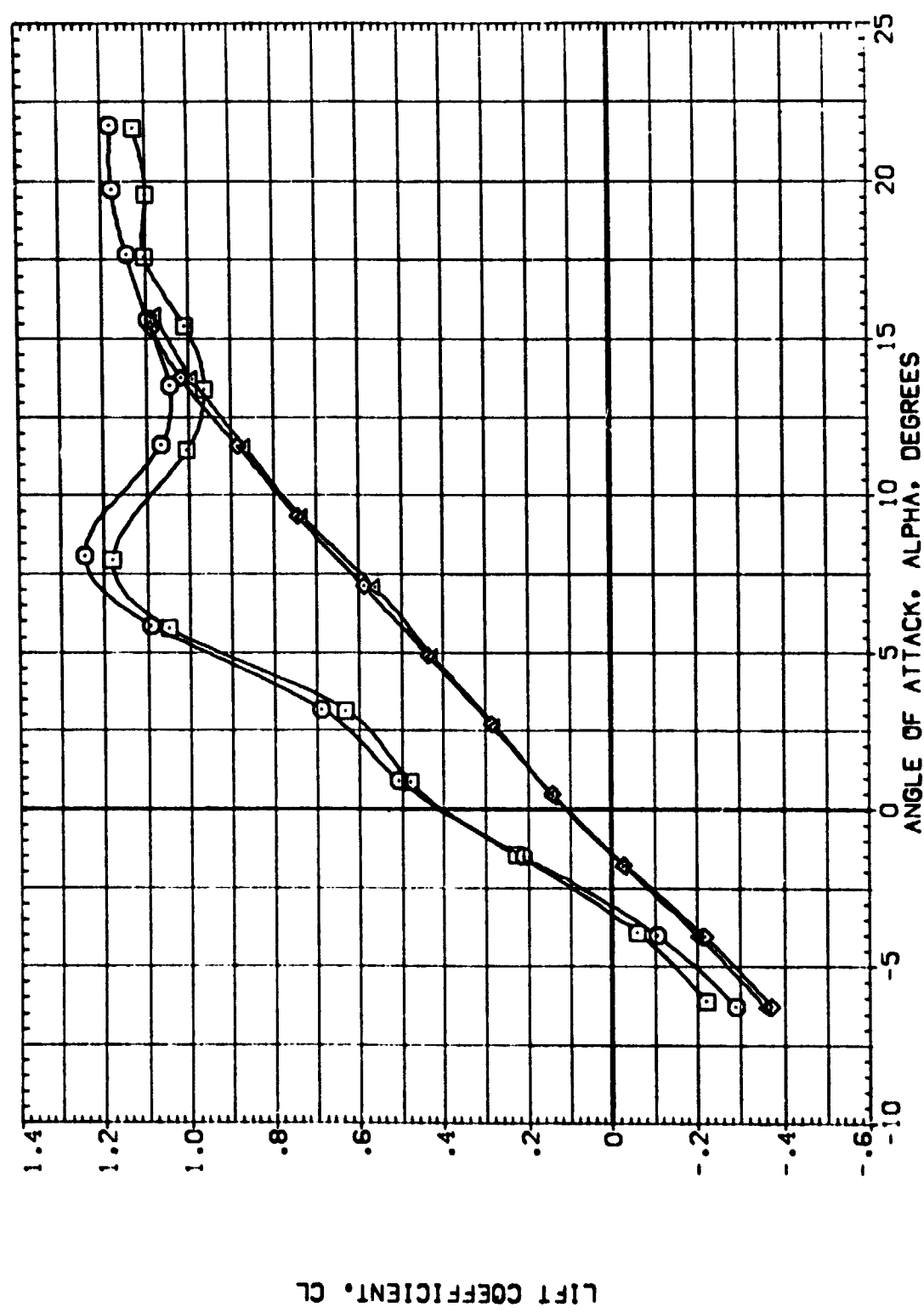


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(B)MACH = .70

DATA SET SYMBO. CONFIGURATION DESCRIPTION  
 (REF:001) V5 B2 T  
 (REF:002) V6 B2 T  
 (REF:003) V5 B2 T  
 (REF:004) V6 B2 T  
 (REF:005) DATA NOT AVAILABLE  
 (REF:006) DATA NOT AVAILABLE

LAMBDA BETA  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000

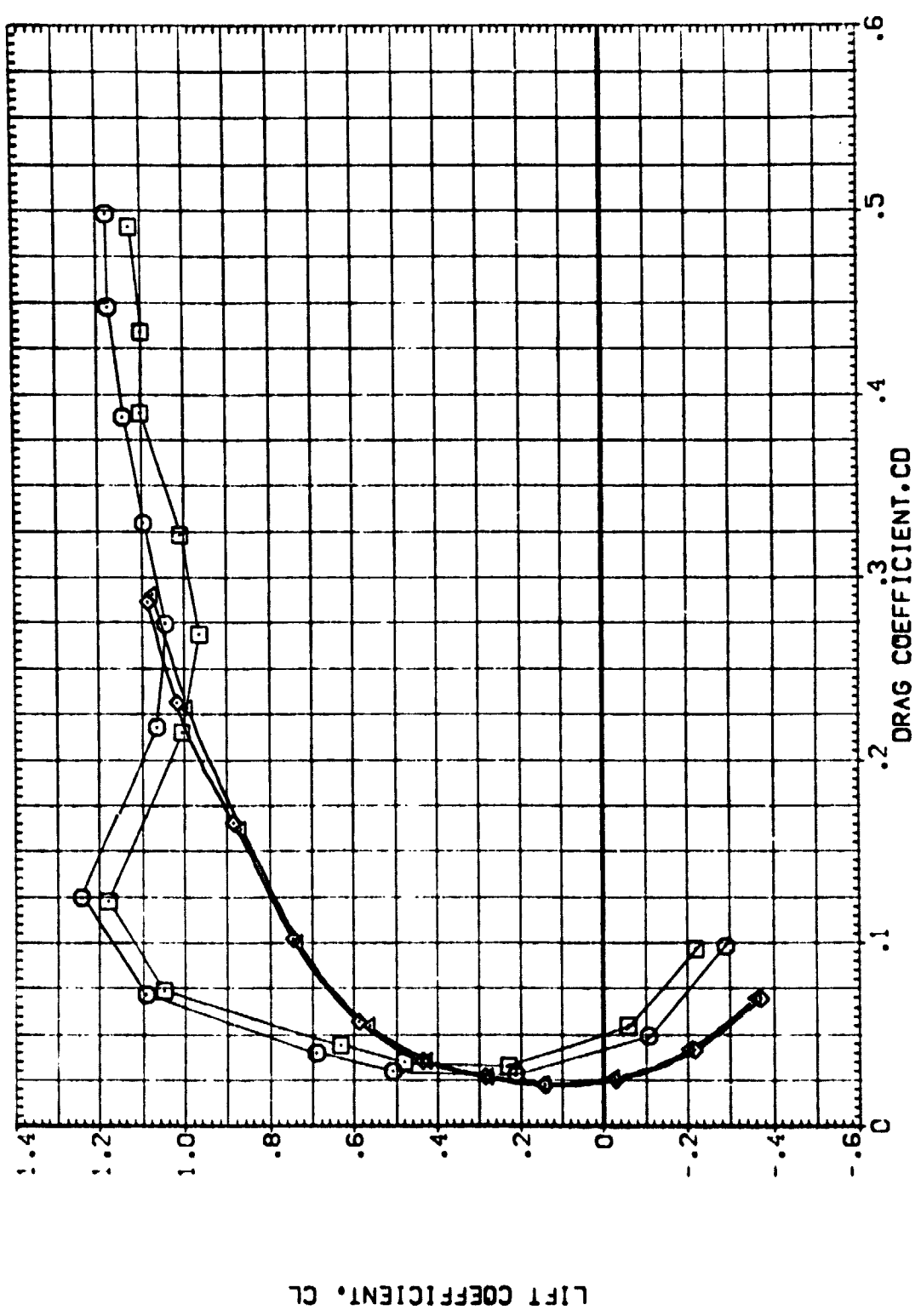
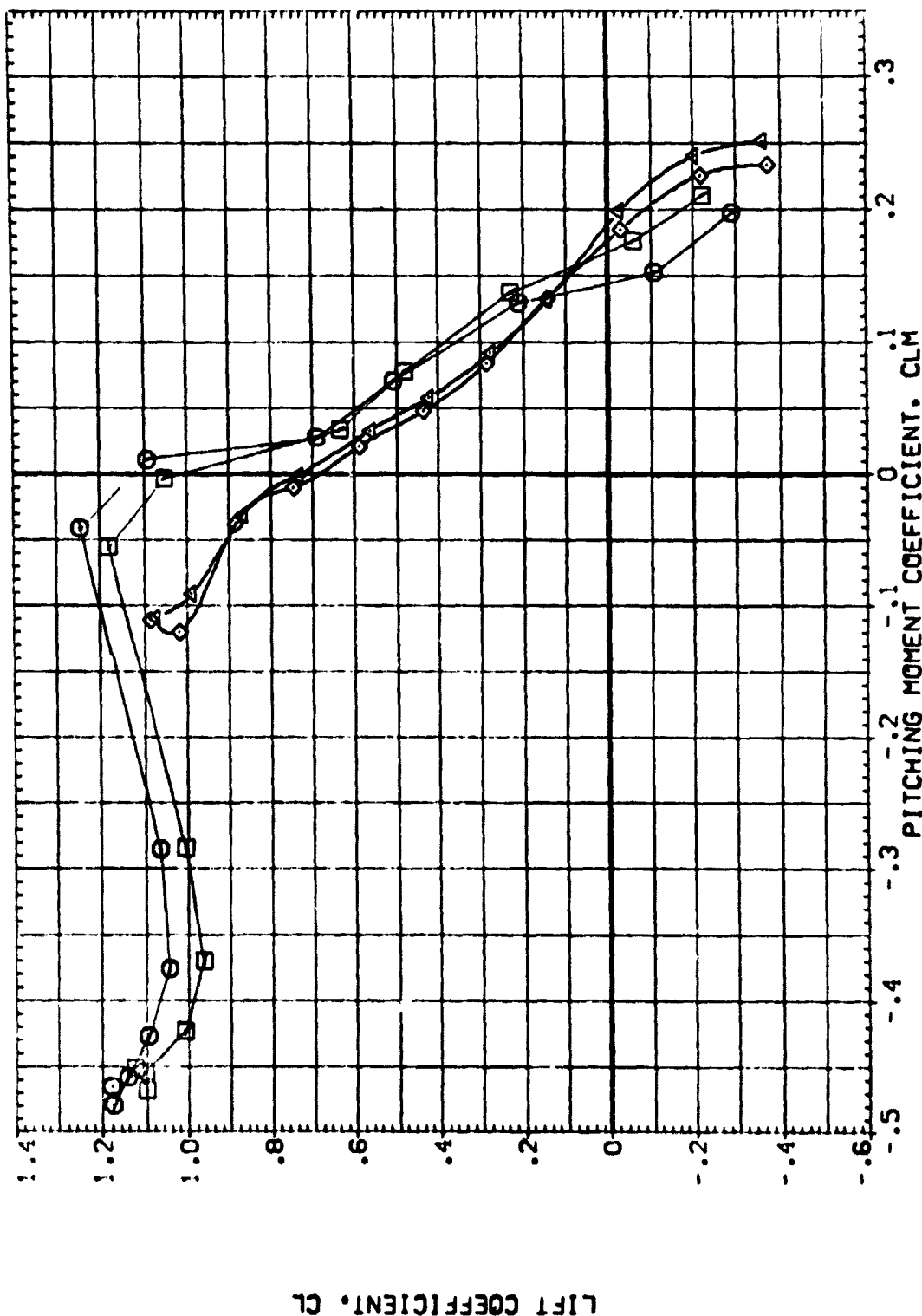


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(3) MACH = .70

DATA SET SYMBO.	CONFIGURATION DESCRIPTION	LAMBDA	BETA
[#001]	72	.000	.000
[#002]	73	.000	.000
[#003]	74	.000	.000
[#004]	75	.45	.000
[#005]	76	.45	.000
[#006]	77	.60	.000
	DATA NOT AVAILABLE		



DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RE-1001] 0 VS B2 T  
 [RE-1002] 0 VS B2 T  
 [RE-1003] 0 VS B2 T  
 [RE-1004] 0 VS B2 T  
 [RE-1005] 0 VS B2 T  
 [RE-1006] 0 VS B2 T  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000  
 60.000 .000

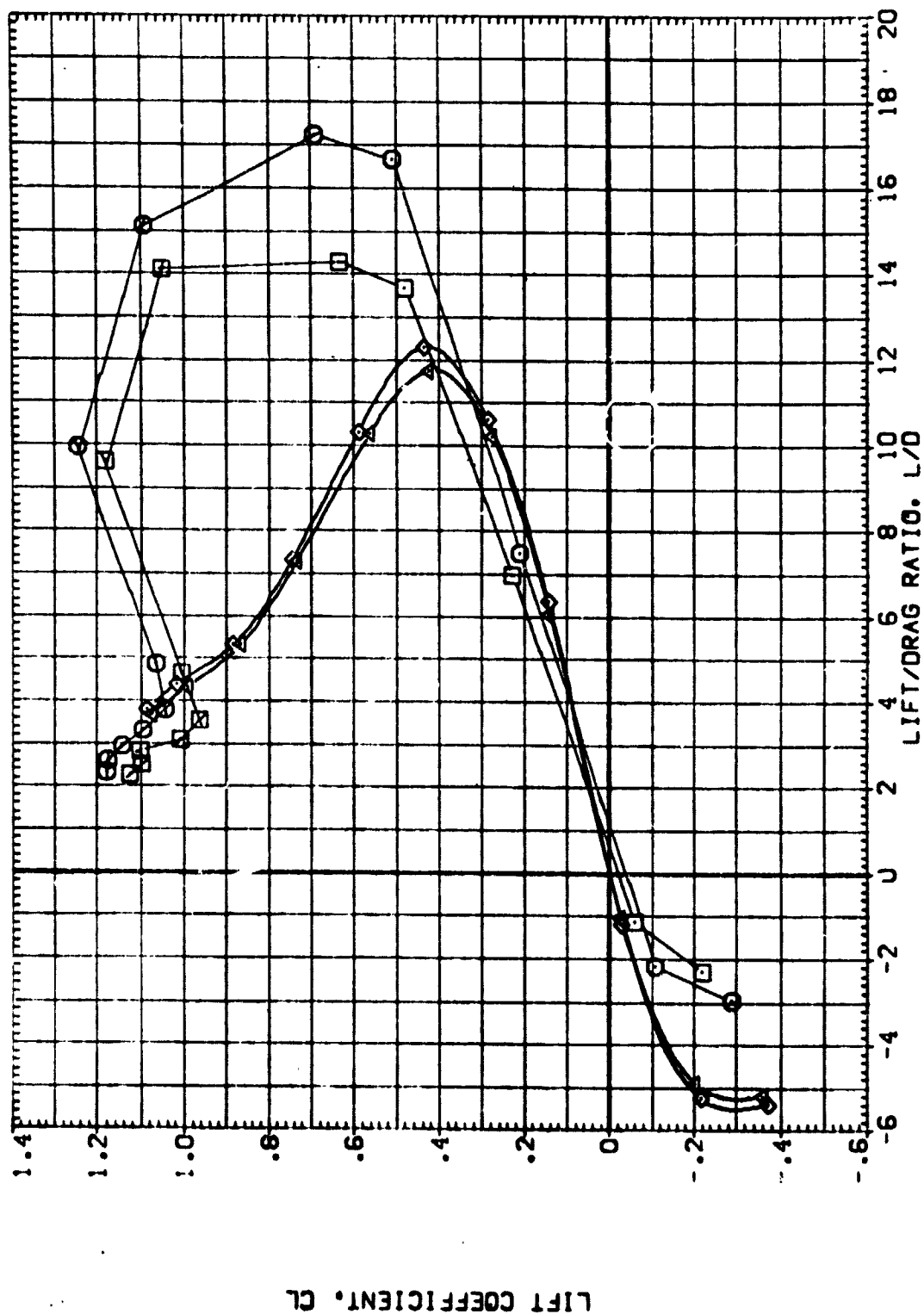


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(3)  $MACH = .70$

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RF1001] V5 B2 T  
 [RF1002] V6 B2 T  
 [RF1003] V5 B2 T  
 [RF1004] V6 B2 T  
 [RF1005] DATA NOT AVAILABLE  
 [RF1006] DATA NOT AVAILABLE

LAMBDA BETA  
 .000 .000  
 .000 .000  
 .45 .000  
 .45 .000  
 .60 .000

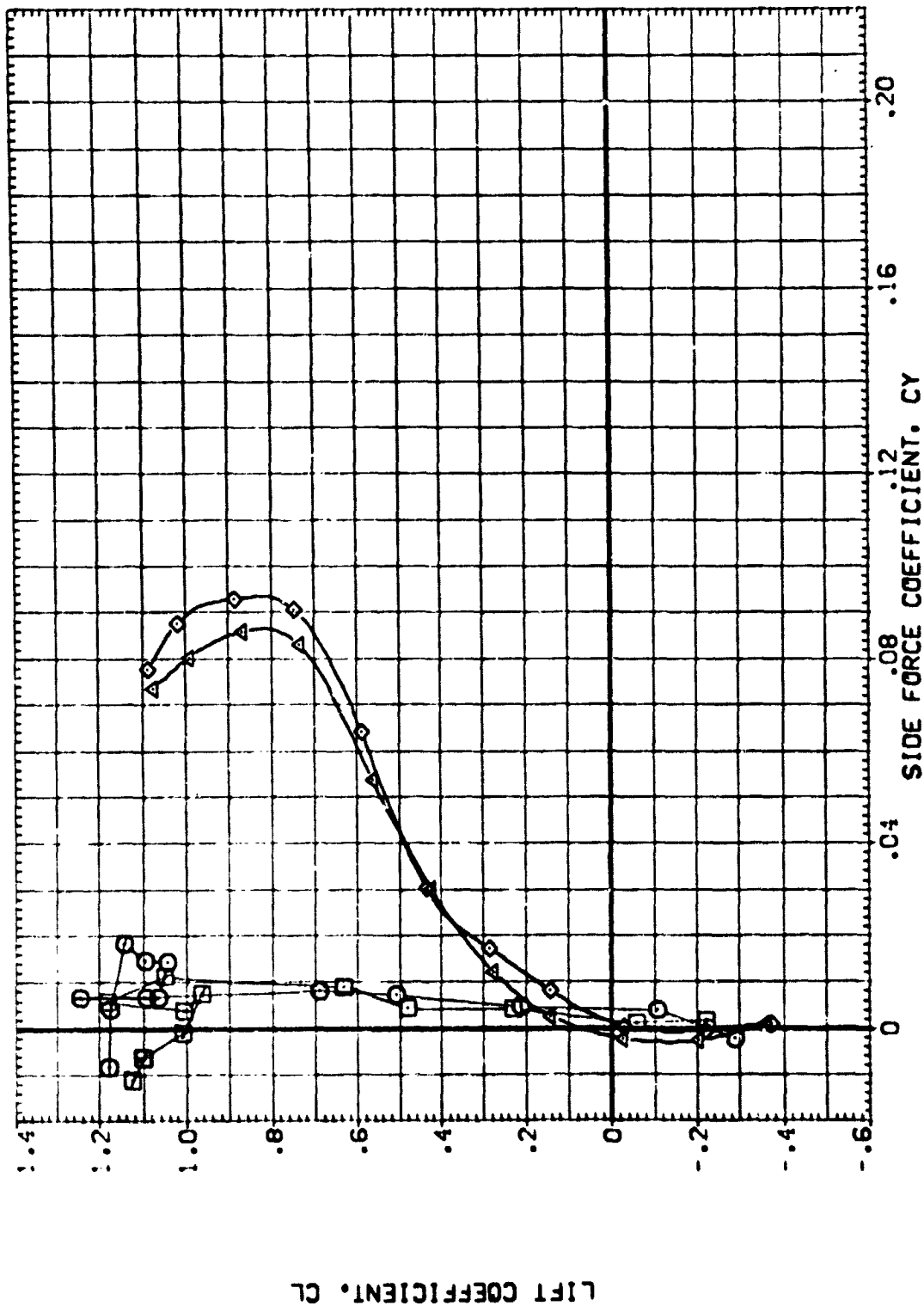


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(B)MACH = .70



DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RE:001] VS B1 T  
 [RE:002] VS B2 T  
 [RE:003] VS B2 T  
 [RE:004] VS B2 T  
 [RE:005] DATA NOT AVAILABLE  
 [RE:006] DATA NOT AVAILABLE

LAMDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000

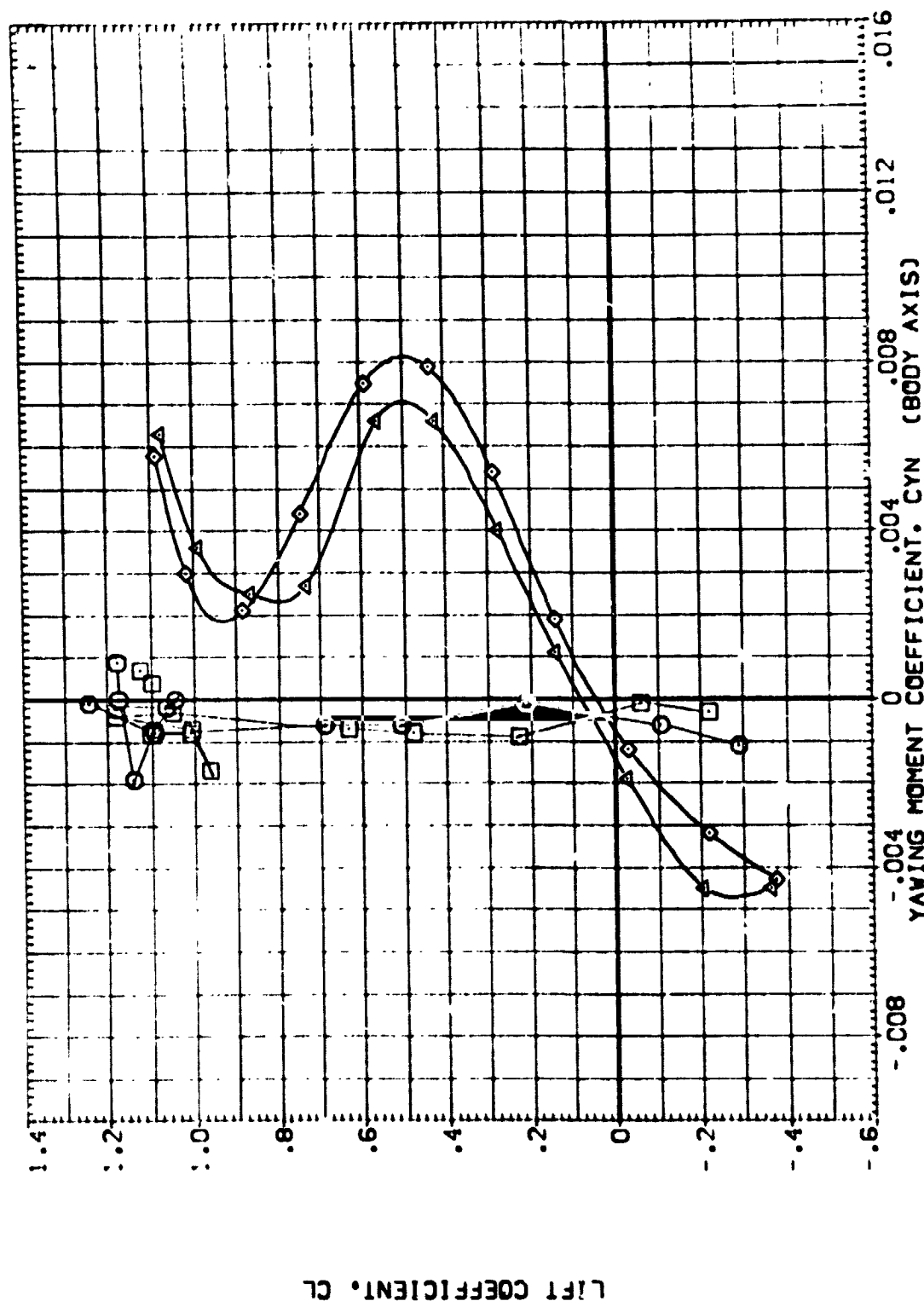


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.  
 (B)MACH = .70

9000 9000 9000  
 5000 5000 5000  
 2000 2000 2000  
 1000 1000 1000

V5 B2  
V6 B2  
V5 B2  
V6 B2

CATC  
CATC

T T  
T T  
T T  
T T

DATA NOT AVAILABLE

LAMBDA	BETA
.000	.000
.000	.000
.45.000	.000
.45.000	.000
.60.000	.000
.60.000	.000

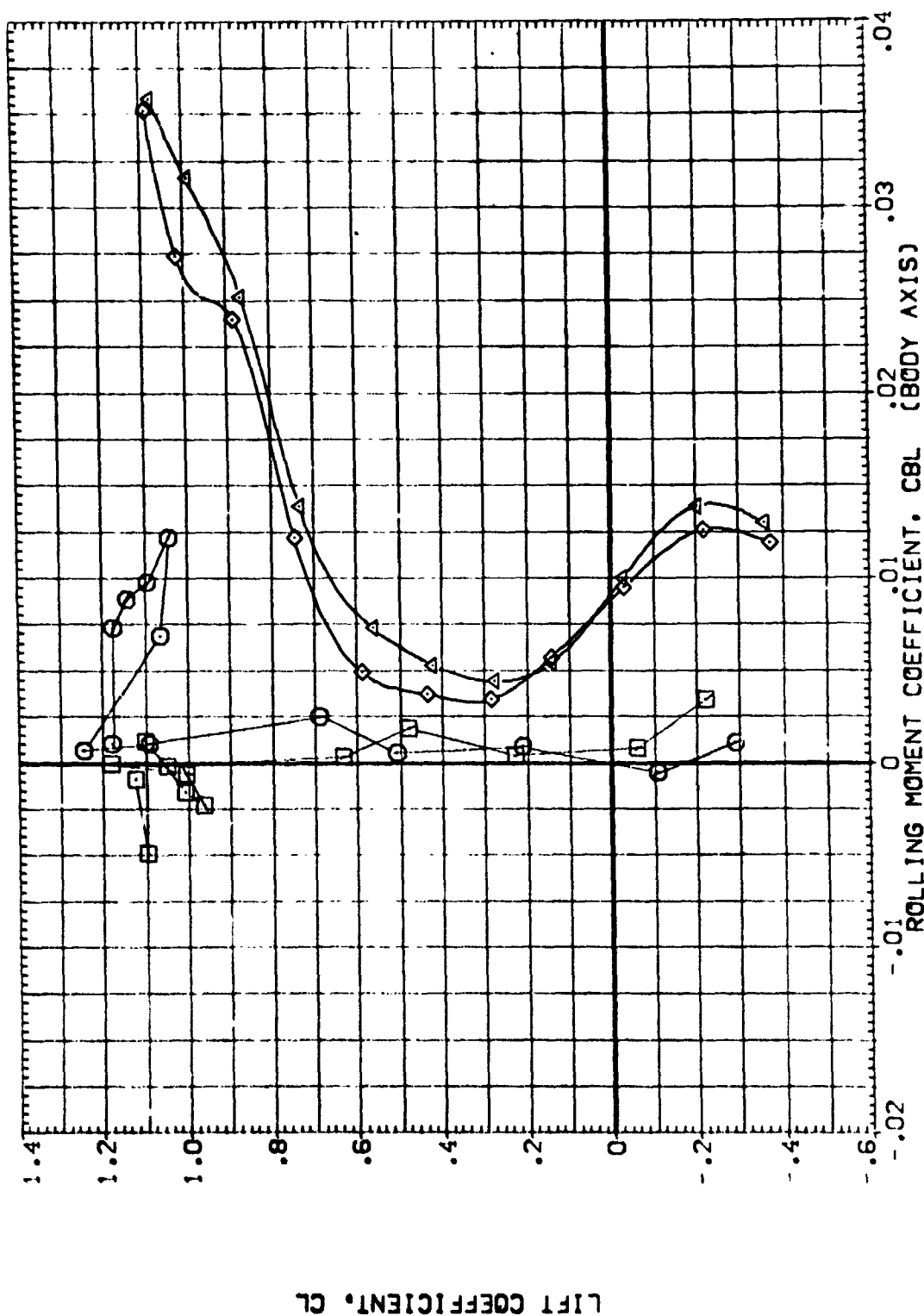
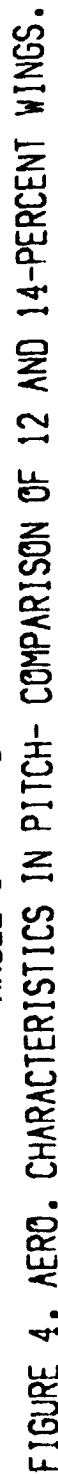


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(3)MAC = .70	PAGE 14
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PAGE 15



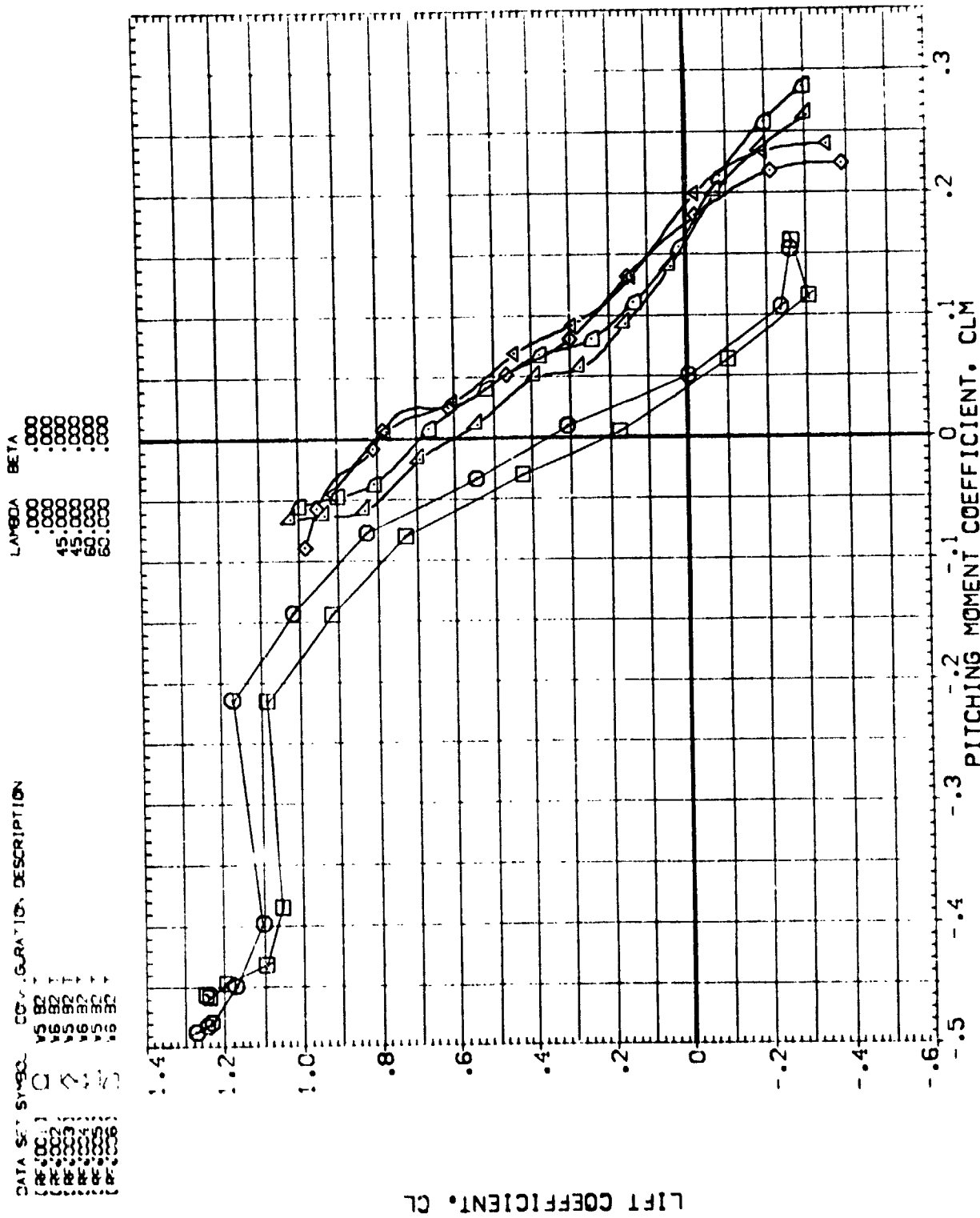


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(C)MAC = .8C

DATA SET SYMBO. CONFIGURATION DESCRIPTION  
 [RE:001] O 32  
 [RE:002] X 32  
 [RE:003] 32  
 [RE:004] 32  
 [RE:005] 32  
 [RE:006] 32

LAMBDA BETA  
 .000 .000  
 .000 .000  
 .45 .000  
 .45 .000  
 .60 .000  
 .60 .000

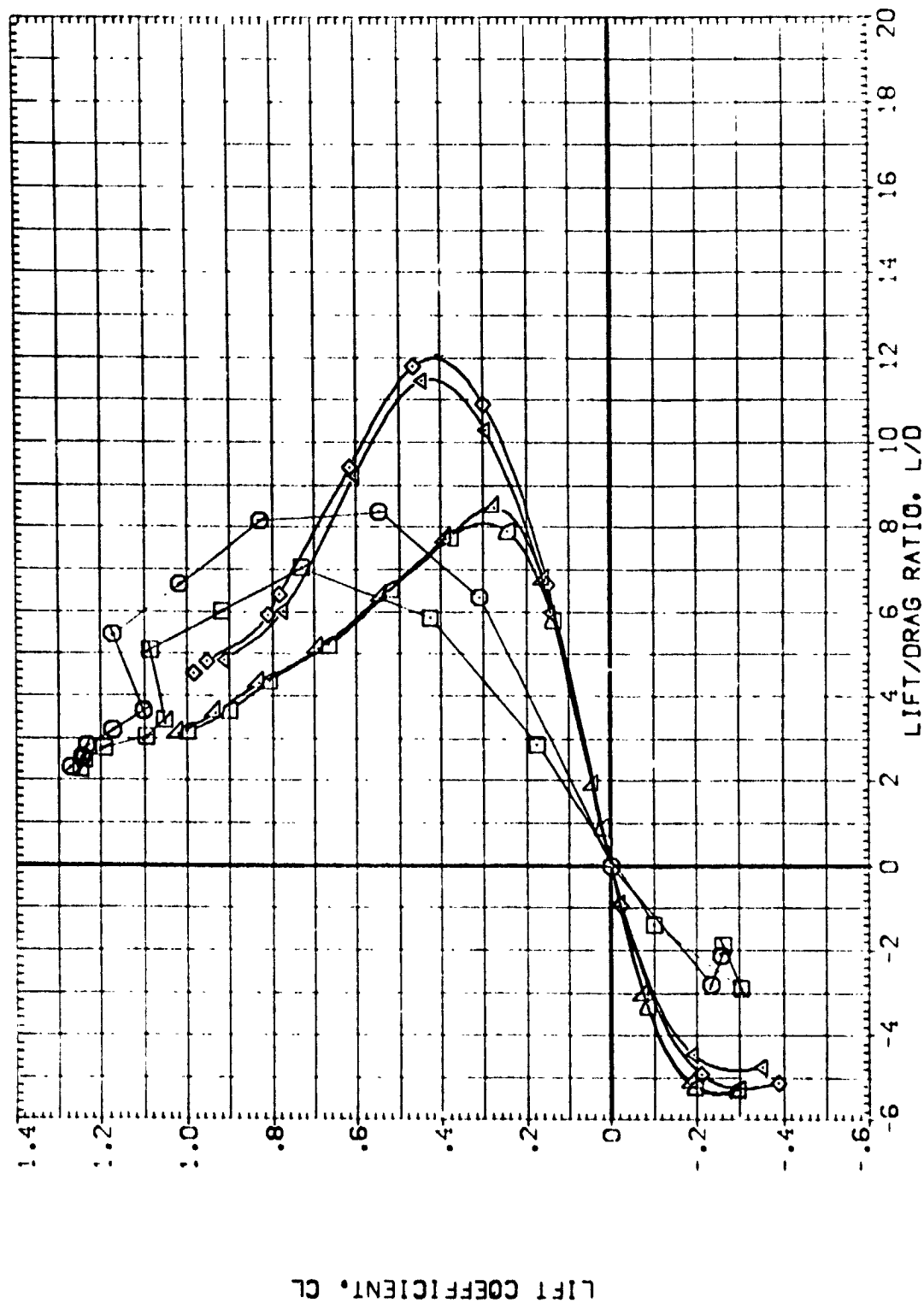
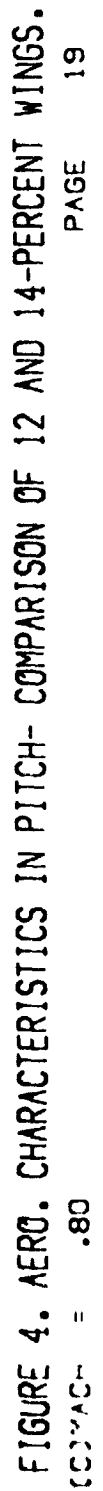


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(C)MAC = .80

LAMBDA	BETA
.000	.000
.000	.000
45.000	.000
45.000	.000
60.000	.000
60.000	.000



DATA SET SYMBOL CONFIGURATION DESCRIPTION

15 B2  
16 B2  
15 B2  
16 B2  
15 B2  
16 B2

LAMBDA BETA  
.000 .000  
.000 .000  
45.000 .000  
60.000 .000  
60.000 .000

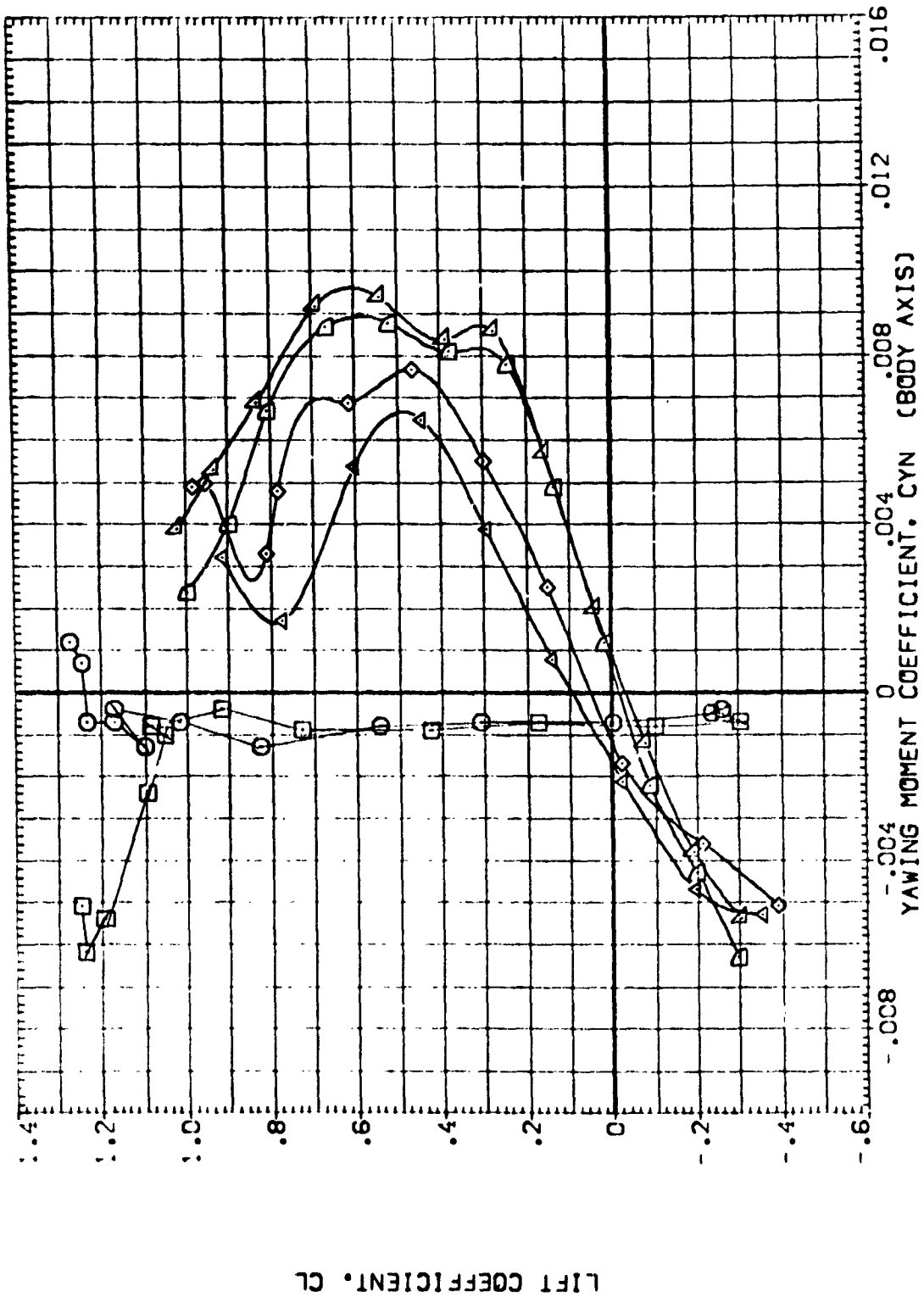


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

COMACH = .80



DATA SET SYMBOL CONFIGURATION DESCRIPTION

(X) 001 VS 82  
 (X) 002 VS 82  
 (X) 003 VS 82  
 (X) 004 VS 82  
 (X) 005 VS 82

LAMBDA BETA  
 .000 .000  
 .000 .000  
 .45 .000  
 .60 .000  
 .60 .000

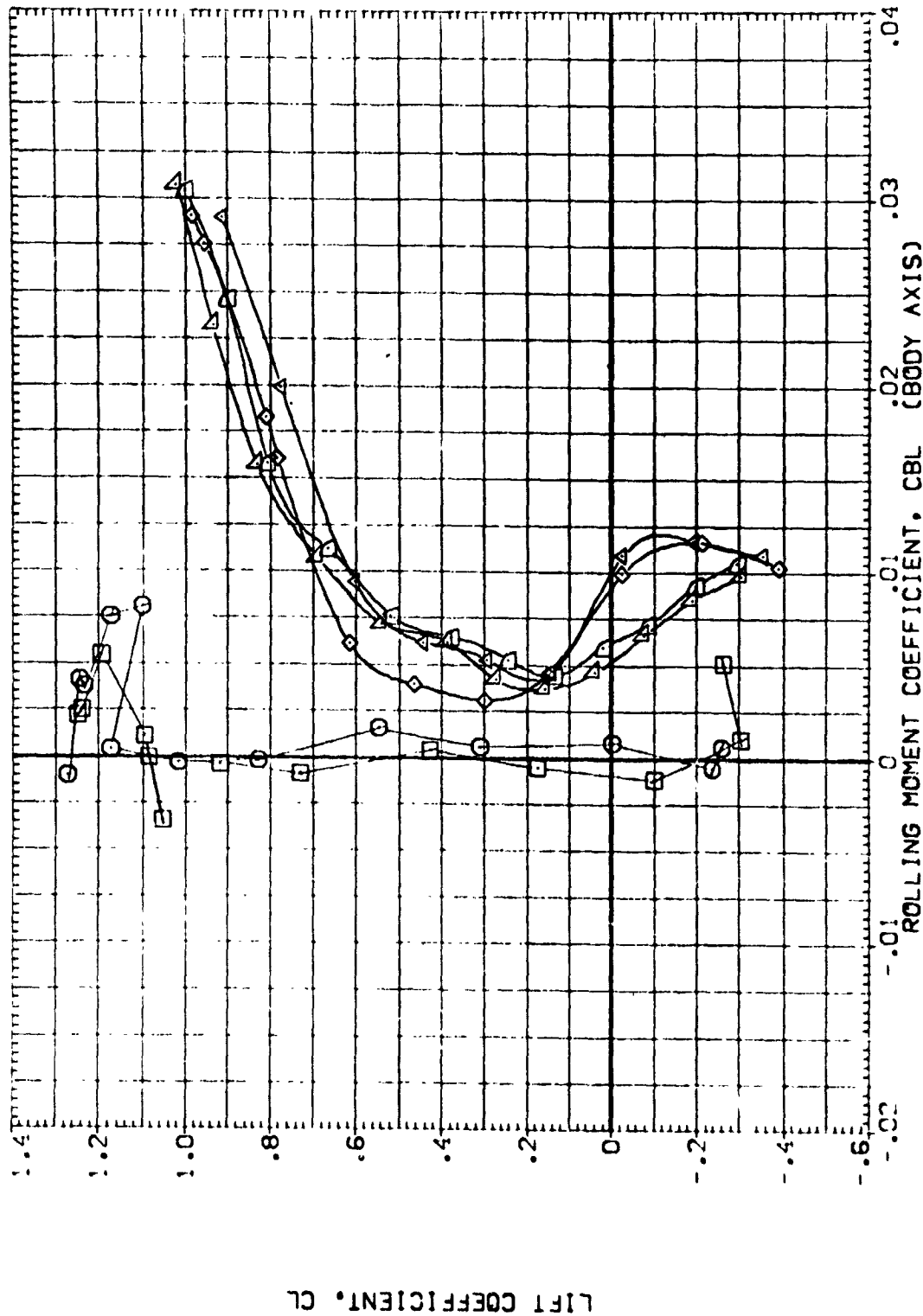


FIGURE 1. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(C) MAC = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	LAMBDA	BETA
[RE:001]	DATA NOT AVAILABLE	.000	.000
[RE:002]	DATA NOT AVAILABLE	.000	.000
[RE:003]	VS B2	45.000	.000
[RE:004]	VS B2 T	45.000	.000
[RE:005]	VS B2 T	60.000	.000
[RE:006]	VS B2	60.000	.000

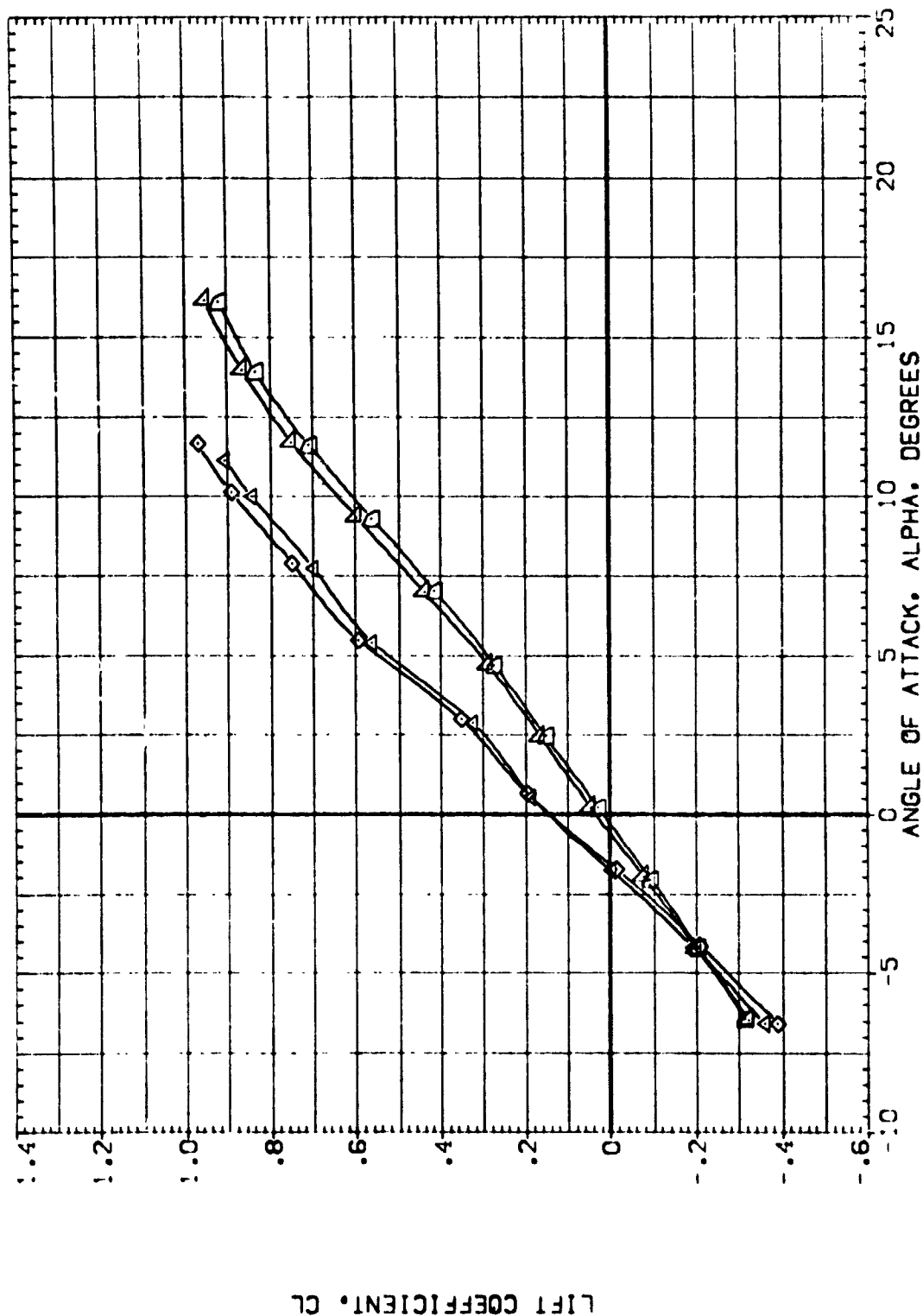


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(C)MAC = .95

DATA SET 5-57  
 [RE-1001]  
 [RE-1002]  
 [RE-1003]  
 [RE-1004]  
 [RE-1005]  
 [RE-1006]

DESCRIPTION  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE

LAMBDA BETA  
 .000 .000  
 .000 .000  
 .000 .000  
 .000 .000  
 .000 .000  
 .000 .000

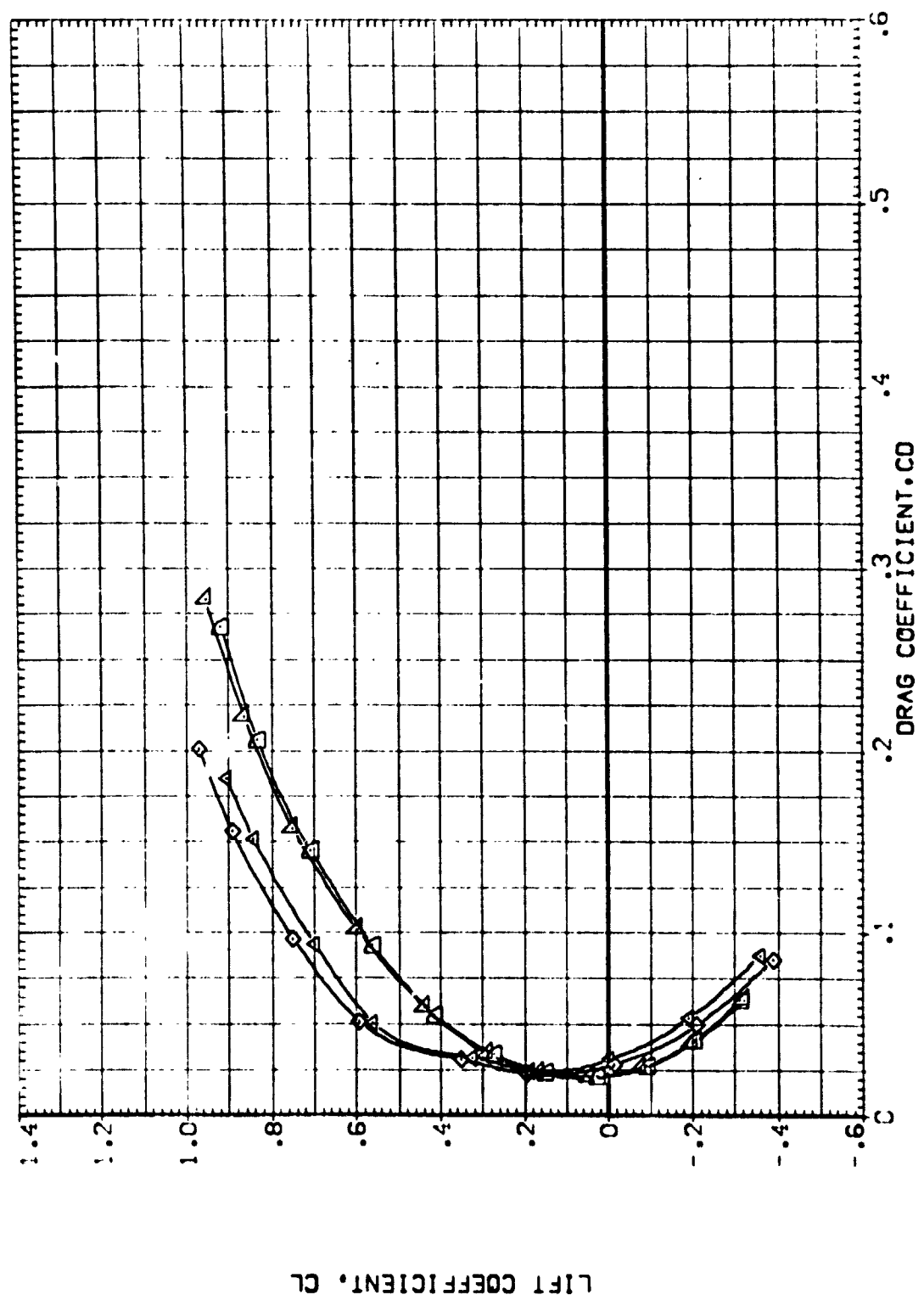


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.  
 (C)MACH = .95 PAGE 23

DATA SET SYMB. CONFIGURATION DESCRIPTION  
 (RE:001) DATA NOT AVAILABLE  
 (RE:002) DATA NOT AVAILABLE  
 (RE:003) 15.82 Y  
 (RE:004) 15.82 Y  
 (RE:005) 15.82 Y  
 (RE:006) 15.82 Y

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 50.000 .000  
 55.000 .000

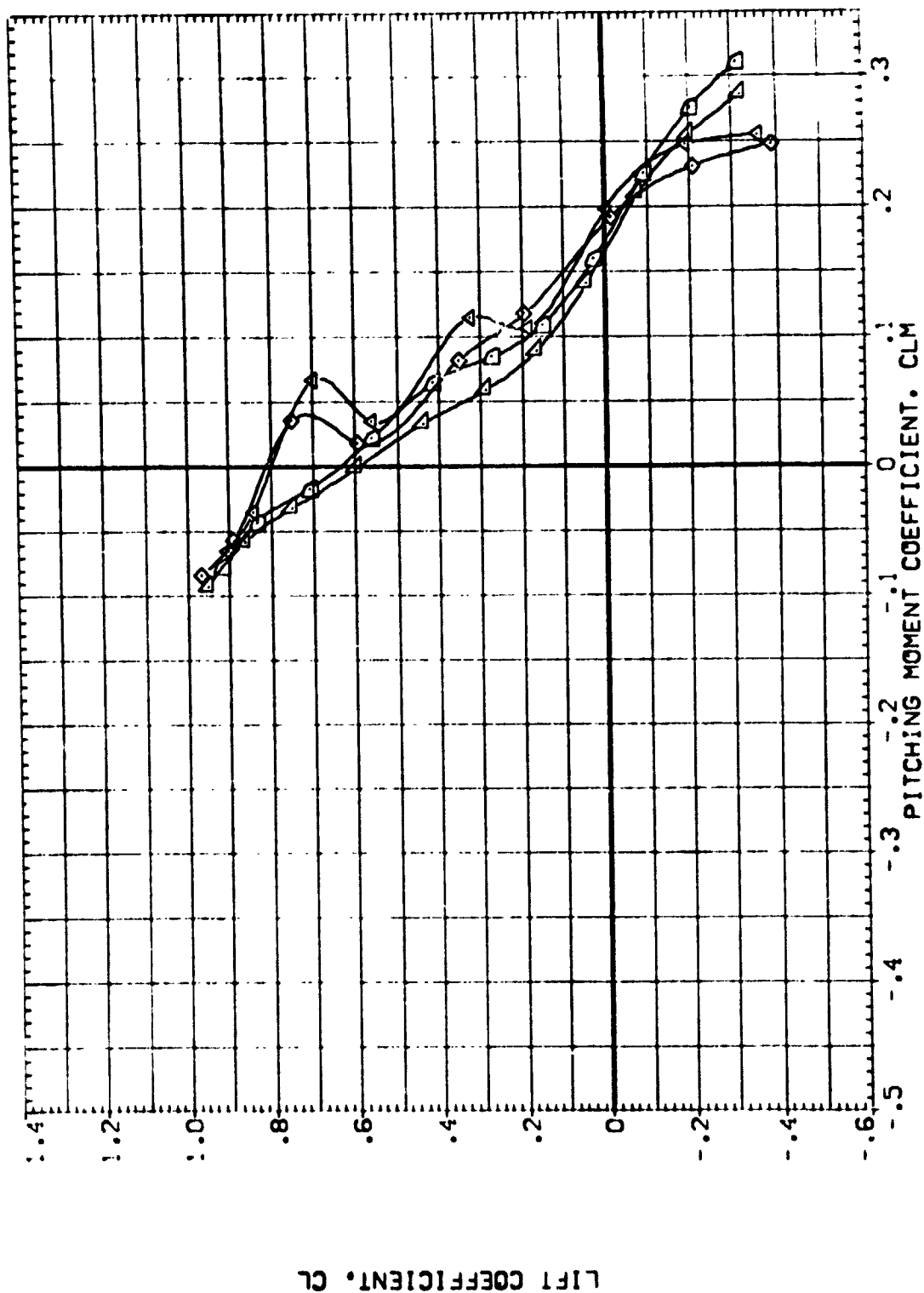


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(C) VAC = .95

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (X) (001) DATA AVAILABLE  
 (X) (002) DATA AVAILABLE  
 (X) (003) DATA AVAILABLE  
 (X) (004) DATA AVAILABLE  
 (X) (005) DATA AVAILABLE  
 (X) (006) DATA AVAILABLE

LAMBDA BETA  
 .000 .000  
 .000 .000  
 .45 .000  
 .45 .000  
 .60 .000  
 .60 .000

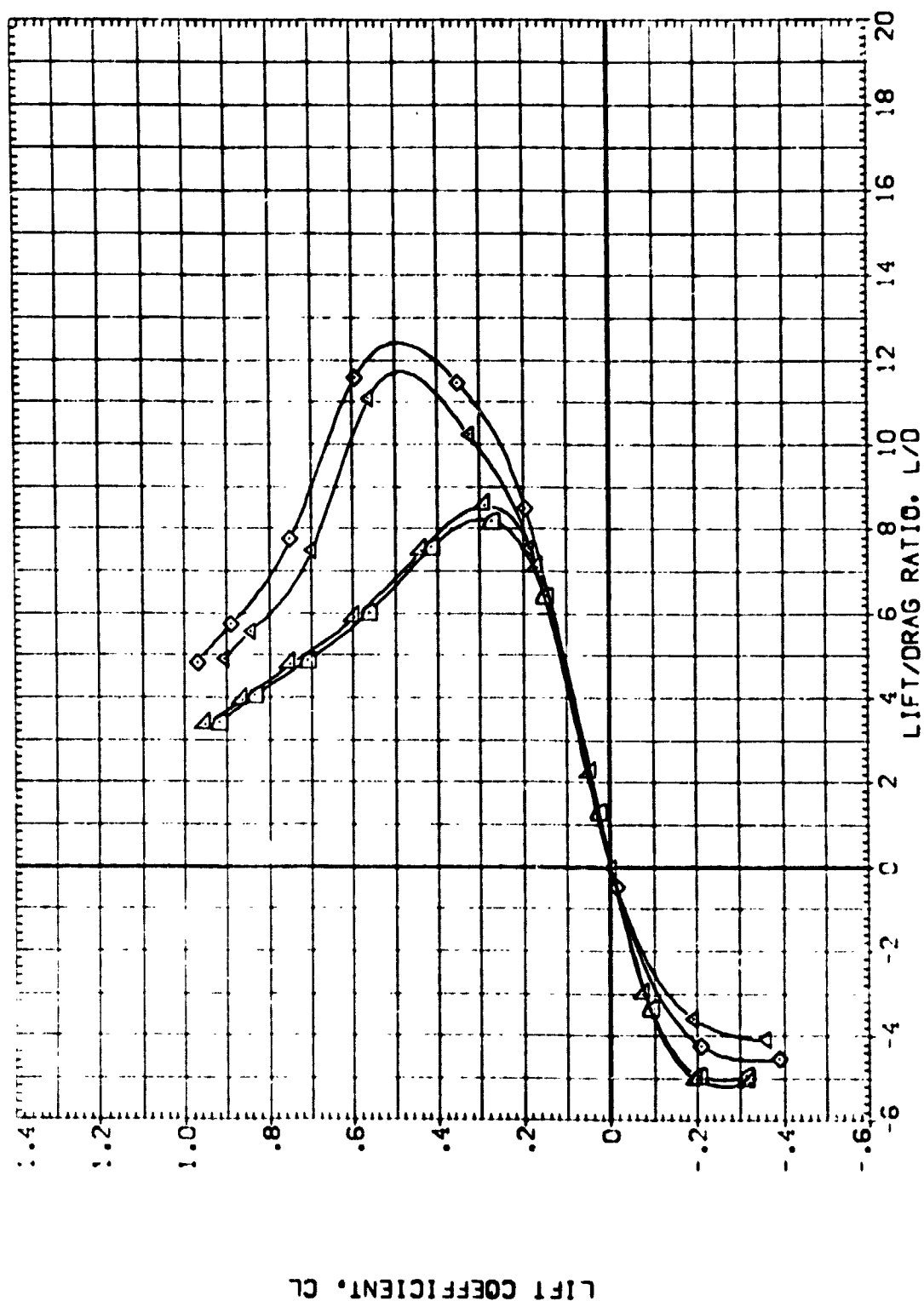


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(C)MAC- = .95

LAMBDA	BETA
.000	.000
.000	.000
.45700	.000
.45700	.000
.60000	.000
.60000	.000

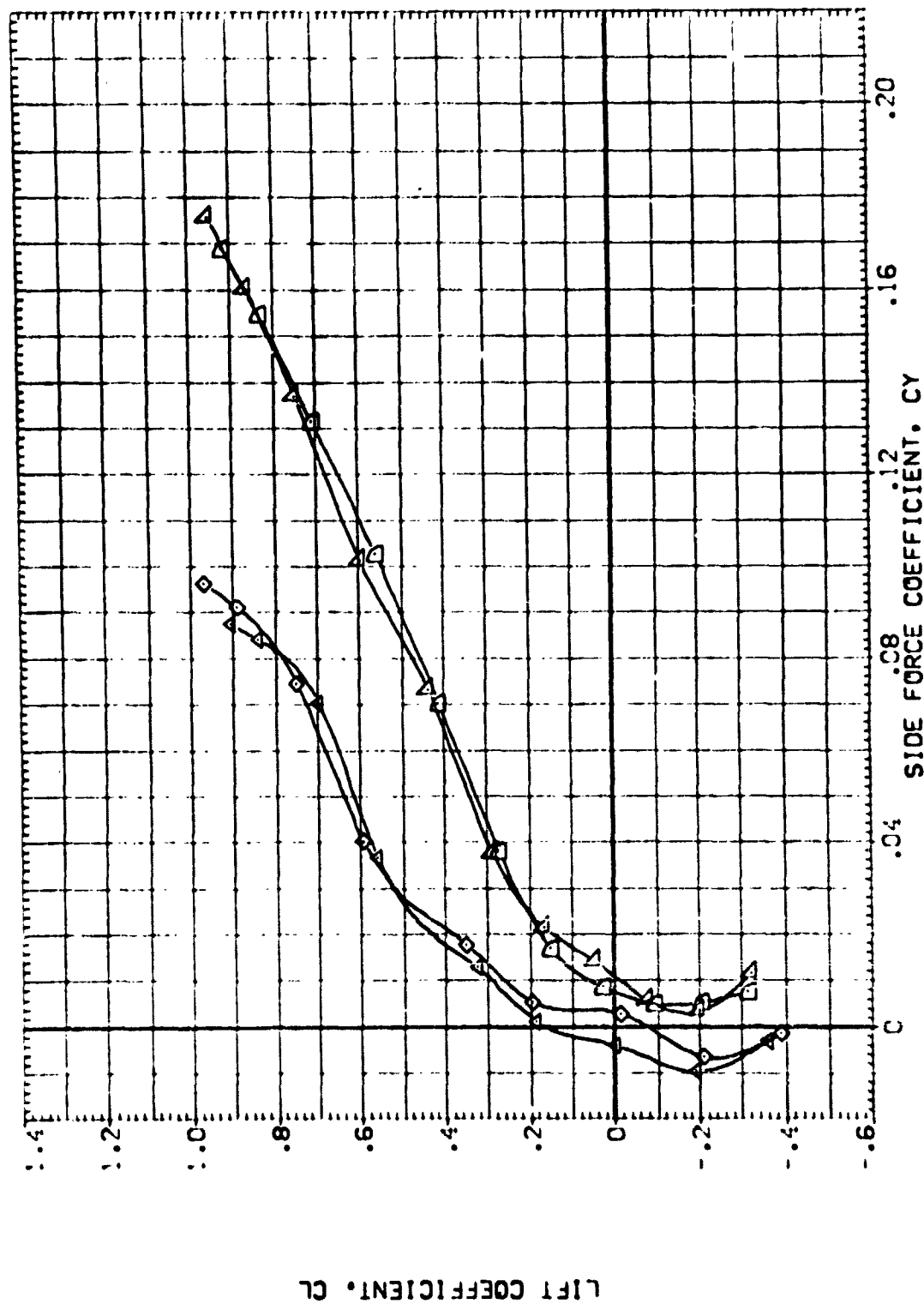


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(C)NAC = .95

PAGE 26

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RE:001] DATA NO. AVAILABLE  
 [RE:002] DATA NO. AVAILABLE  
 [RE:003] DATA NO. AVAILABLE  
 [RE:004] DATA NO. AVAILABLE  
 [RE:005] DATA NO. AVAILABLE  
 [RE:006] DATA NO. AVAILABLE

LAMDA BETA  
 .000 .000  
 .000 .000  
 .45 .000  
 .45 .000  
 .60 .000  
 .60 .000

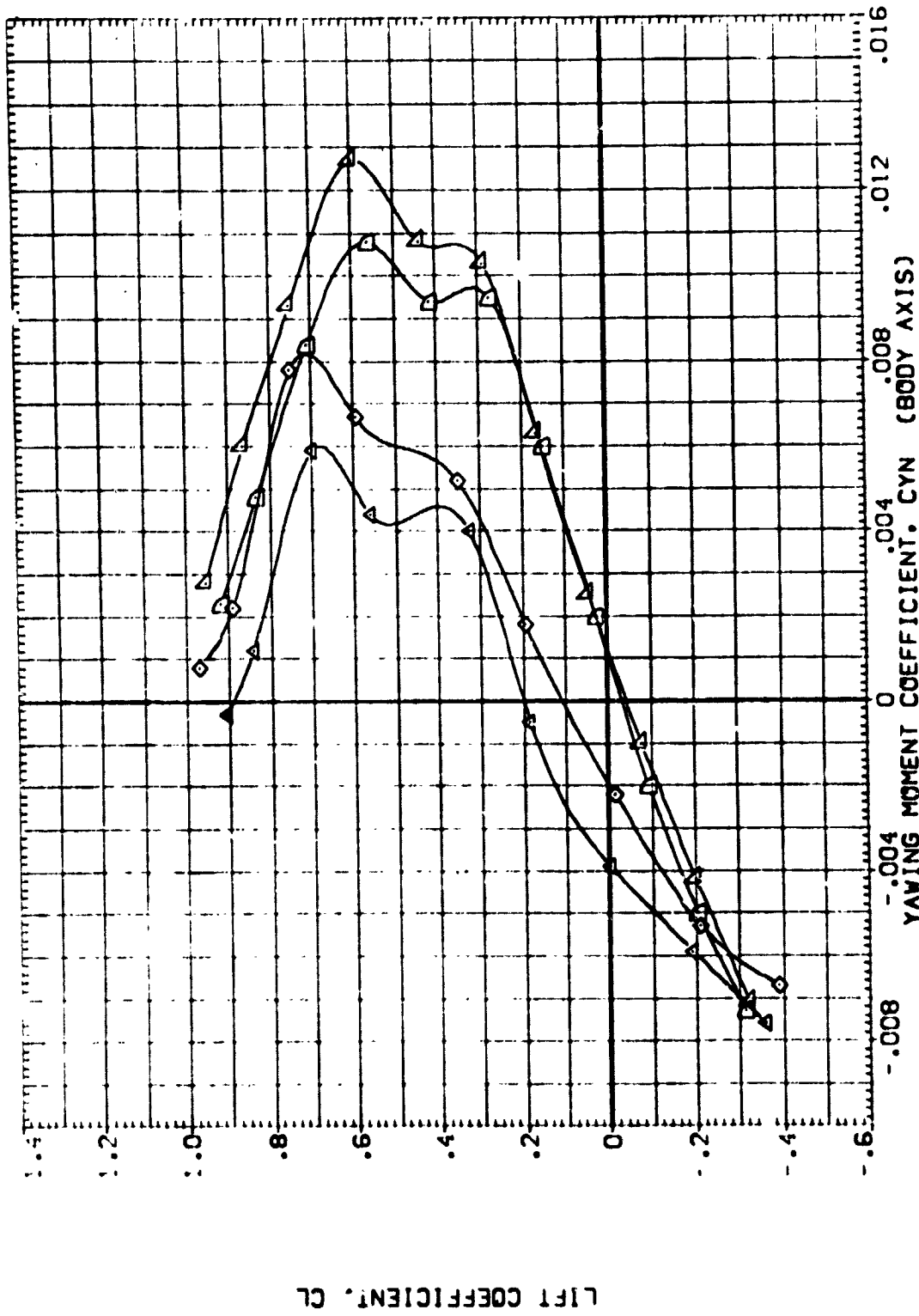


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(C)YACH = .95

DATA SET SYMBOL    CONFIGURATION DESCRIPTION  
 [REF:001]    DATA NOT AVAILABLE  
 [REF:002]    DATA NOT AVAILABLE  
 [REF:003]    15 B2  
 [REF:004]    15 B2  
 [REF:005]    15 B2  
 [REF:006]    15 B2

LAMBDA    BETA  
 .000    .000  
 .000    .000  
 45.000    .000  
 45.000    .000  
 60.000    .000  
 60.000    .000

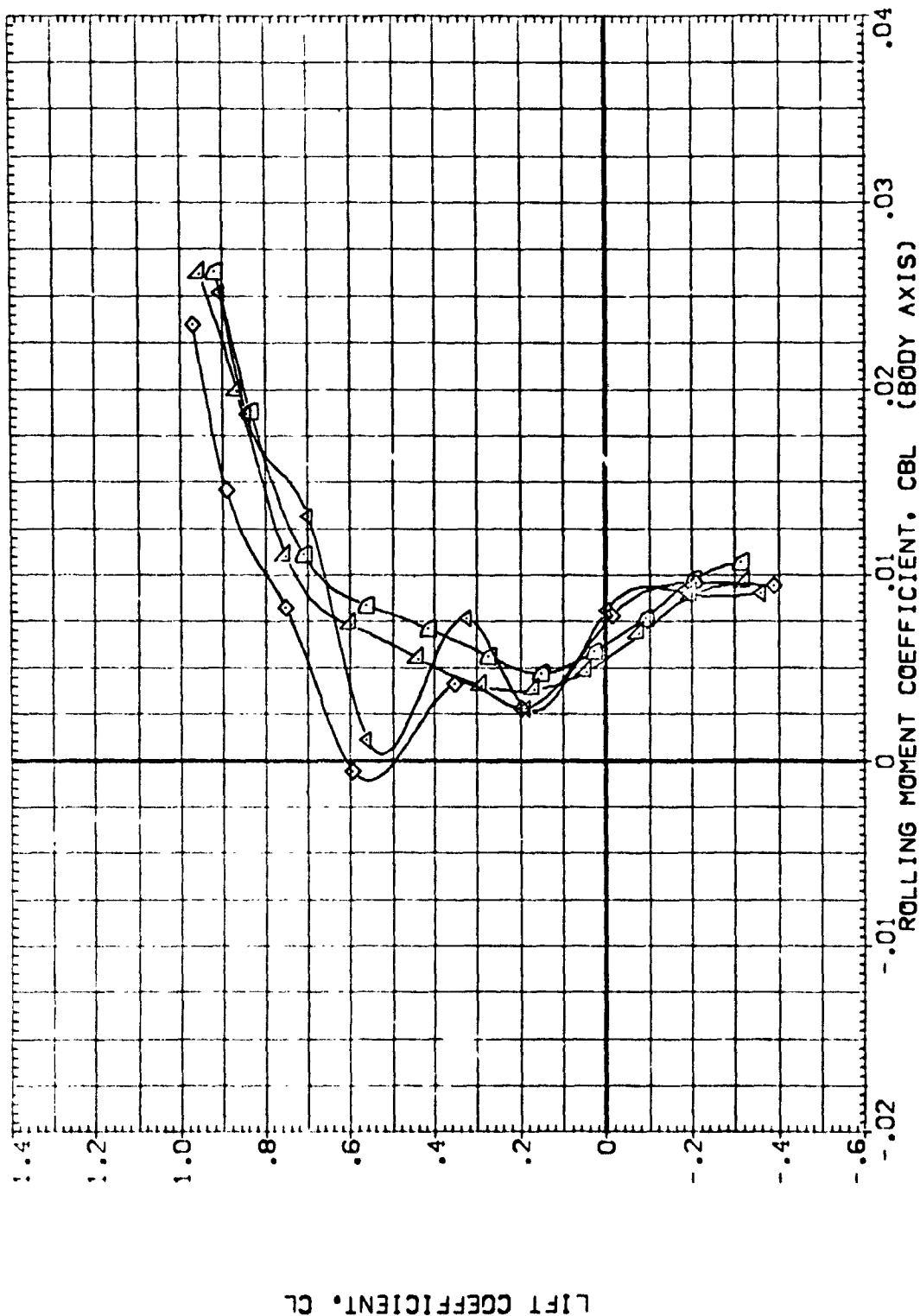


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

COJ MACH = .95



DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RE:001] DATA NOT AVAILABLE  
 [RE:002] DATA NOT AVAILABLE  
 [RE:003] V5 B2  
 [RE:004] V6 B2  
 [RE:005] V5 B2  
 [RE:006] V6 B2

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000  
 60.000 .000

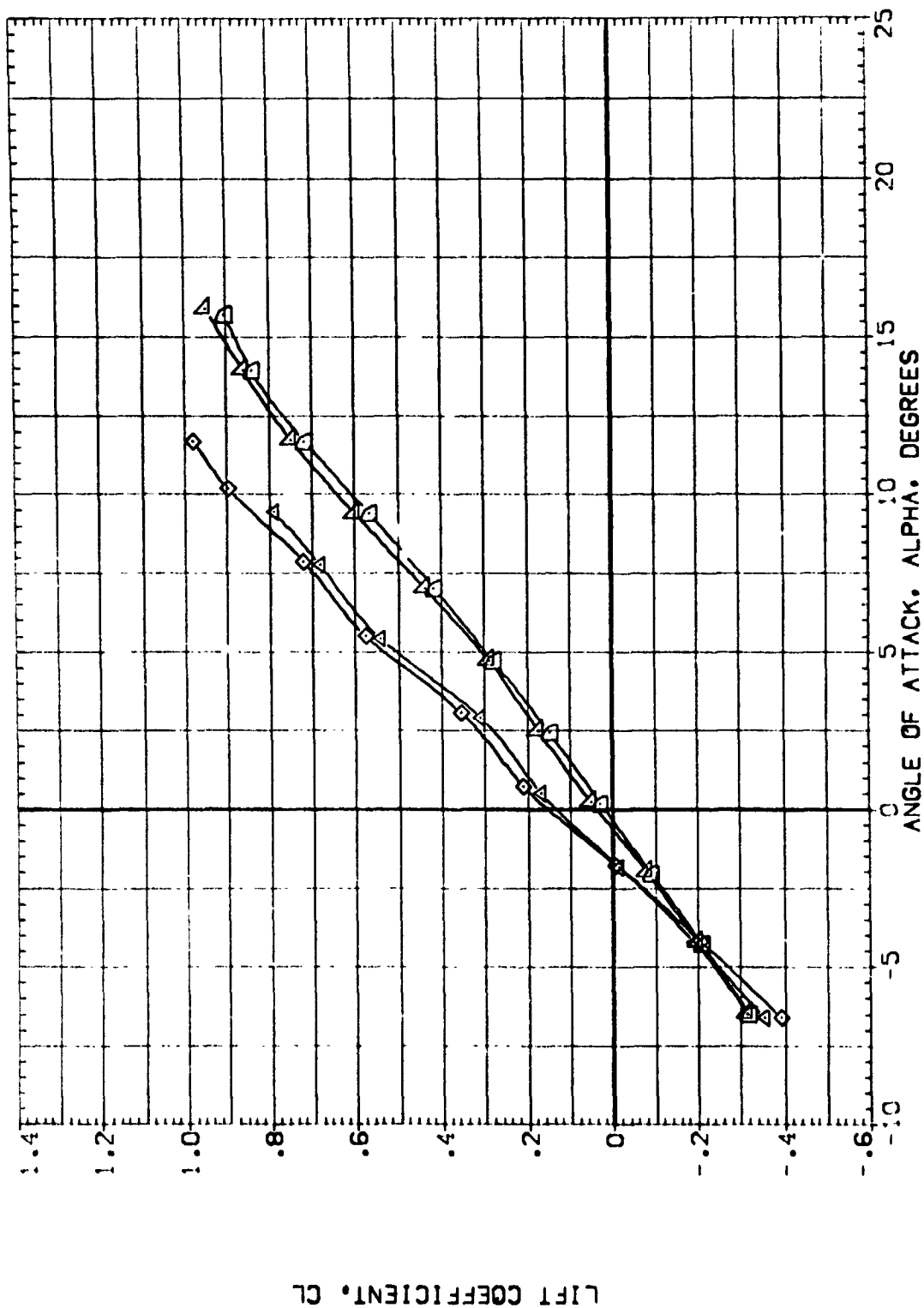


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [X:001] DATA NOT AVAILABLE  
 [X:002] DATA NOT AVAILABLE  
 [X:003] 15 30 Y  
 [X:004] 15 30 Y  
 [X:005] 15 30 Y  
 [X:006] 15 30 Y

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000

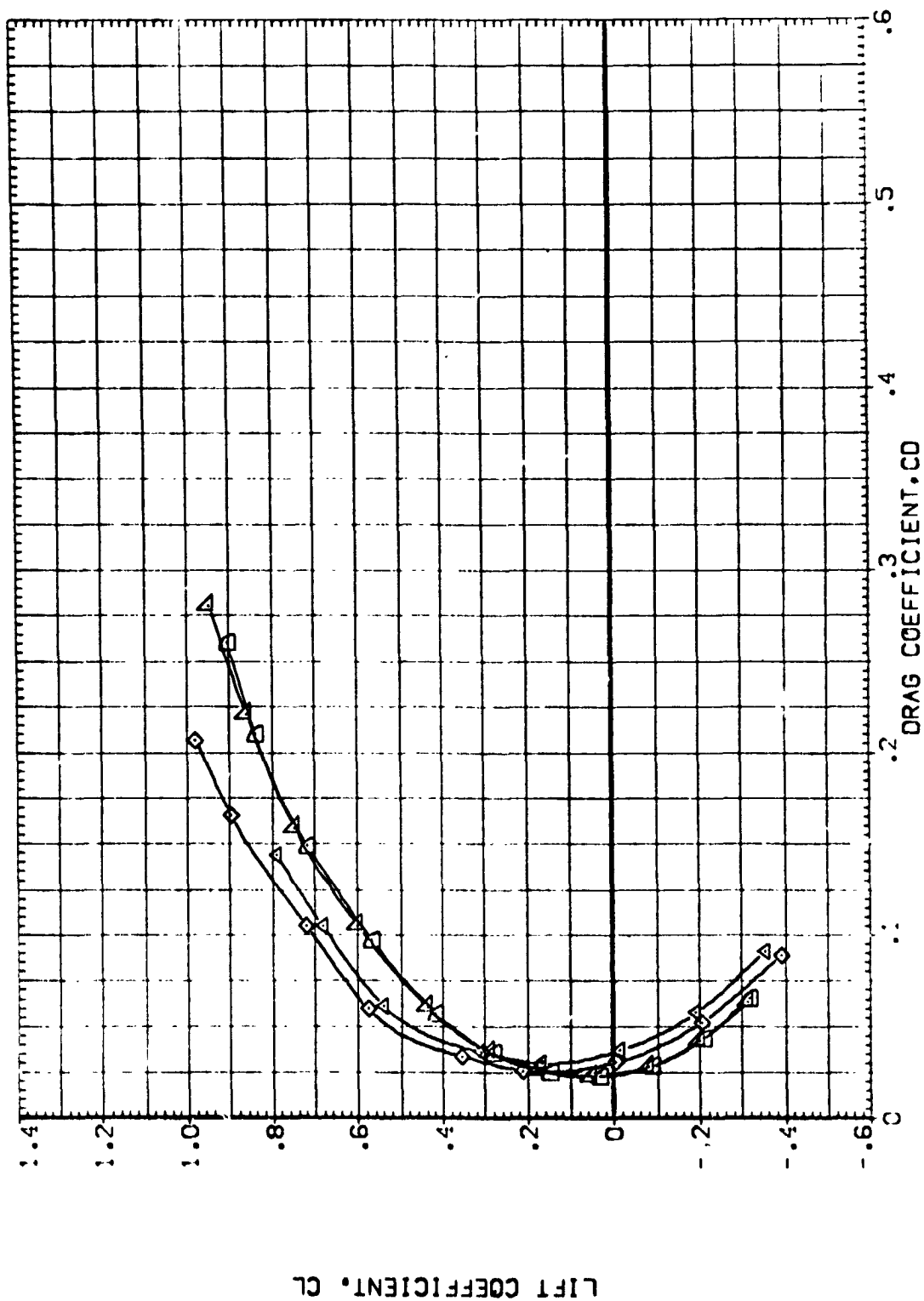


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(M)MACH = .98

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RE:001] DATA NOT AVAILABLE  
 [RE:002] DATA NOT AVAILABLE  
 [RE:003] 15.82  
 [RE:004] 15.82  
 [RE:005] 15.82  
 [RE:006] 15.82

LAMBDA BETA  
 .000 .000  
 .45 .000  
 .45 .000  
 .60 .000  
 .60 .000

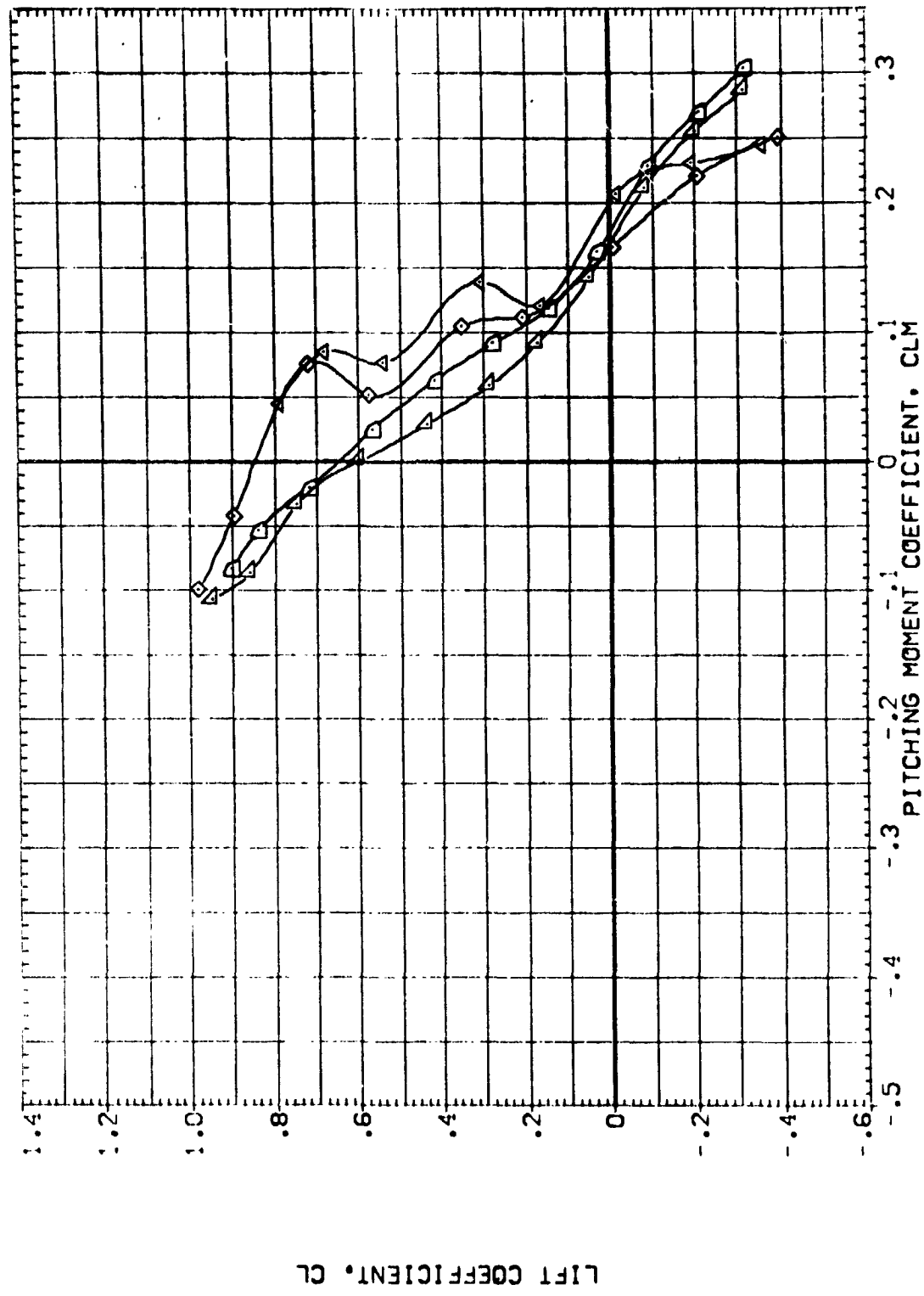


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

LAMBDA	BETA
.000	.000
.000	.000
.15.000	.000
.15.000	.000
.60.000	.000
.60.000	.000

FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

$$C(E)_{MACH} = .98$$

	LAMBDA	BETA
1	.000	.000
2	.000	.000
3	45.000	.000
4	45.000	.000
5	60.000	.000
6	60.000	.000

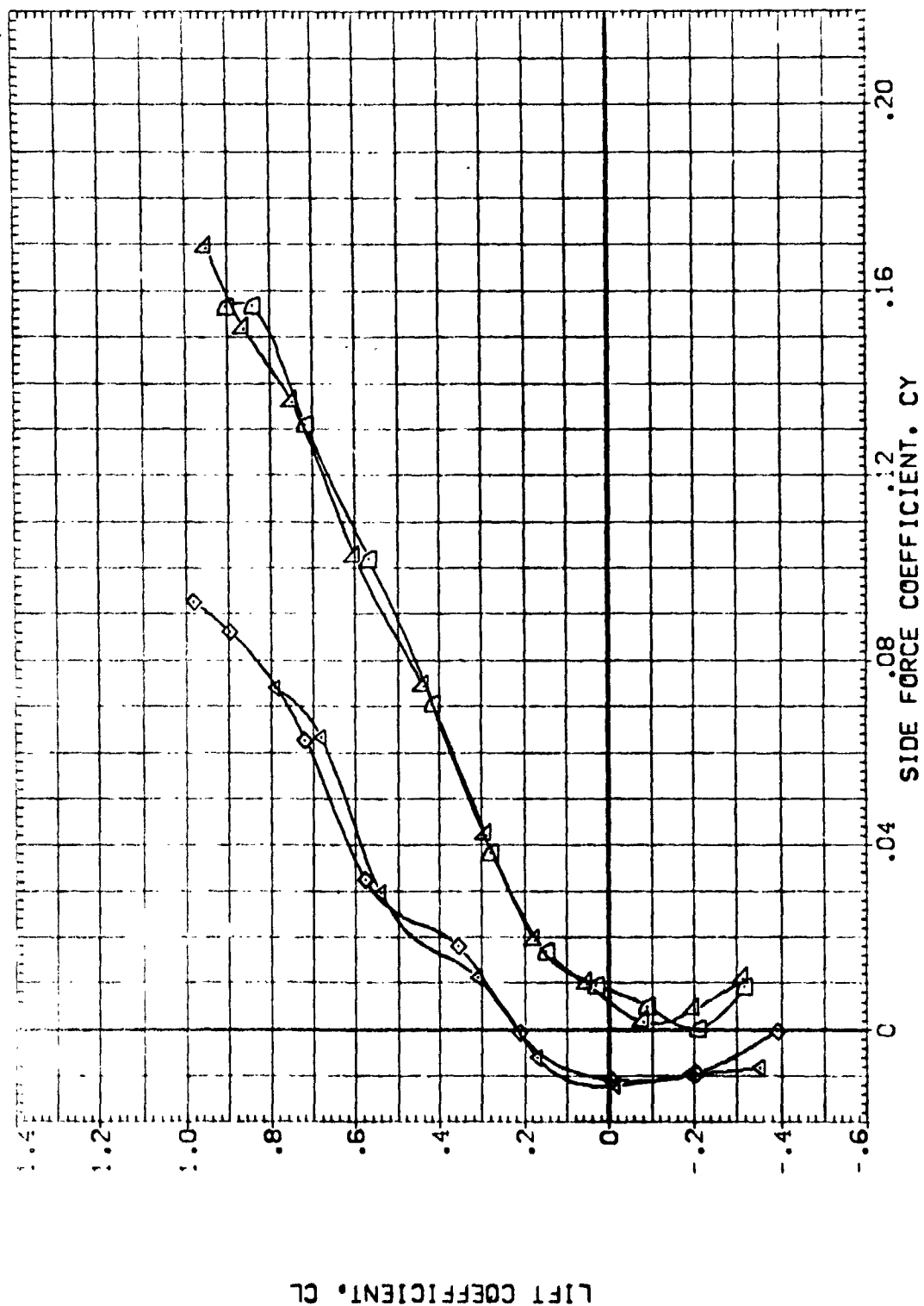


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

86.98 = HCVACH

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RE:001] DATA NOT AVAILABLE  
 [RE:002] DATA NOT AVAILABLE  
 [RE:003] V5 B2  
 [RE:004] V6 B2  
 [RE:005] V5 B2  
 [RE:006] V6 B2

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000

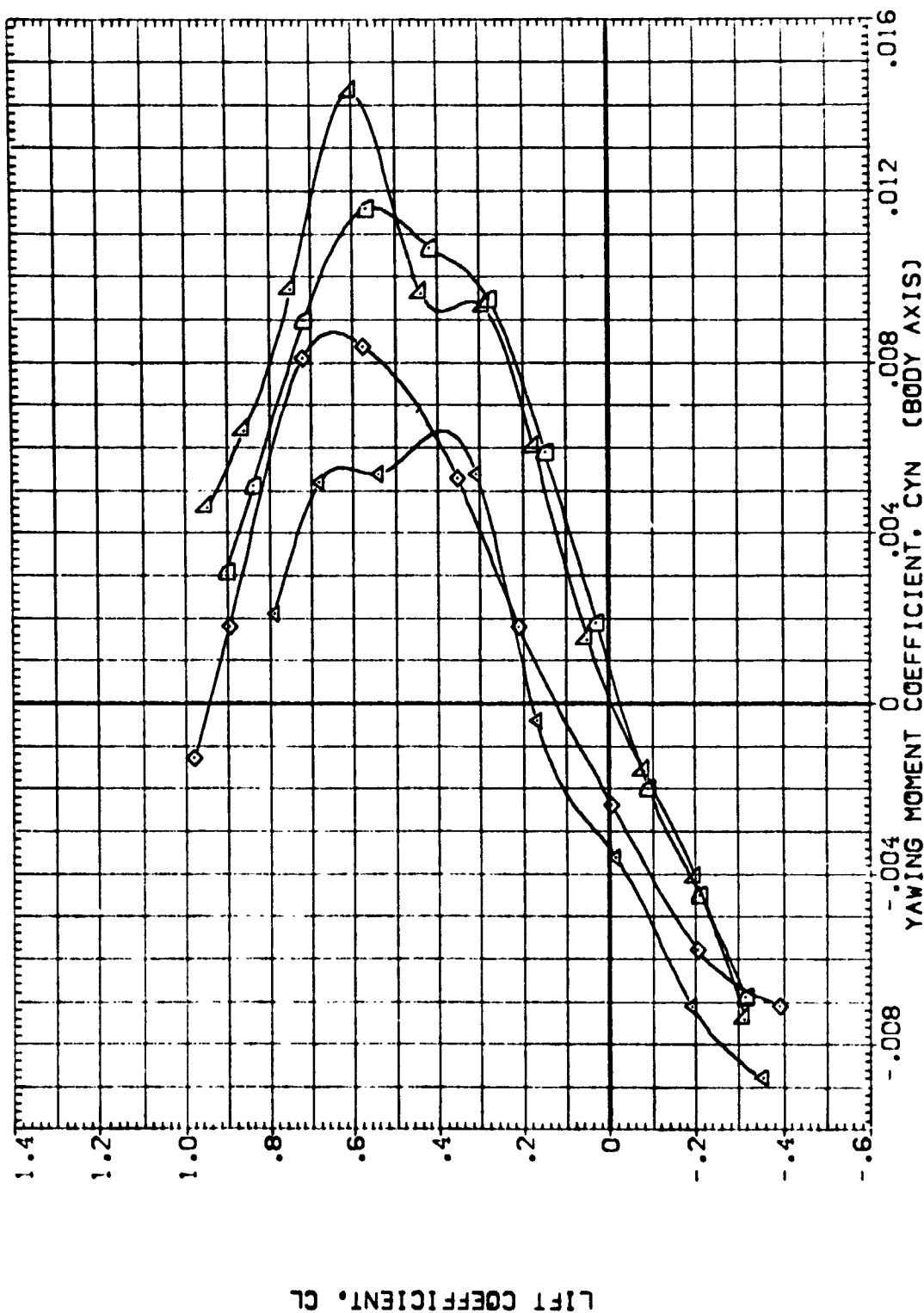


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(E)MACH = .98

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (X) (X) (X) DATA NOT AVAILABLE  
 (X) (X) (X) DATA NOT AVAILABLE  
 (X) (X) (X) VS 82  
 (X) (X) (X) VS 82  
 (X) (X) (X) VS 82  
 (X) (X) (X) VS 82

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000  
 60.000 .000

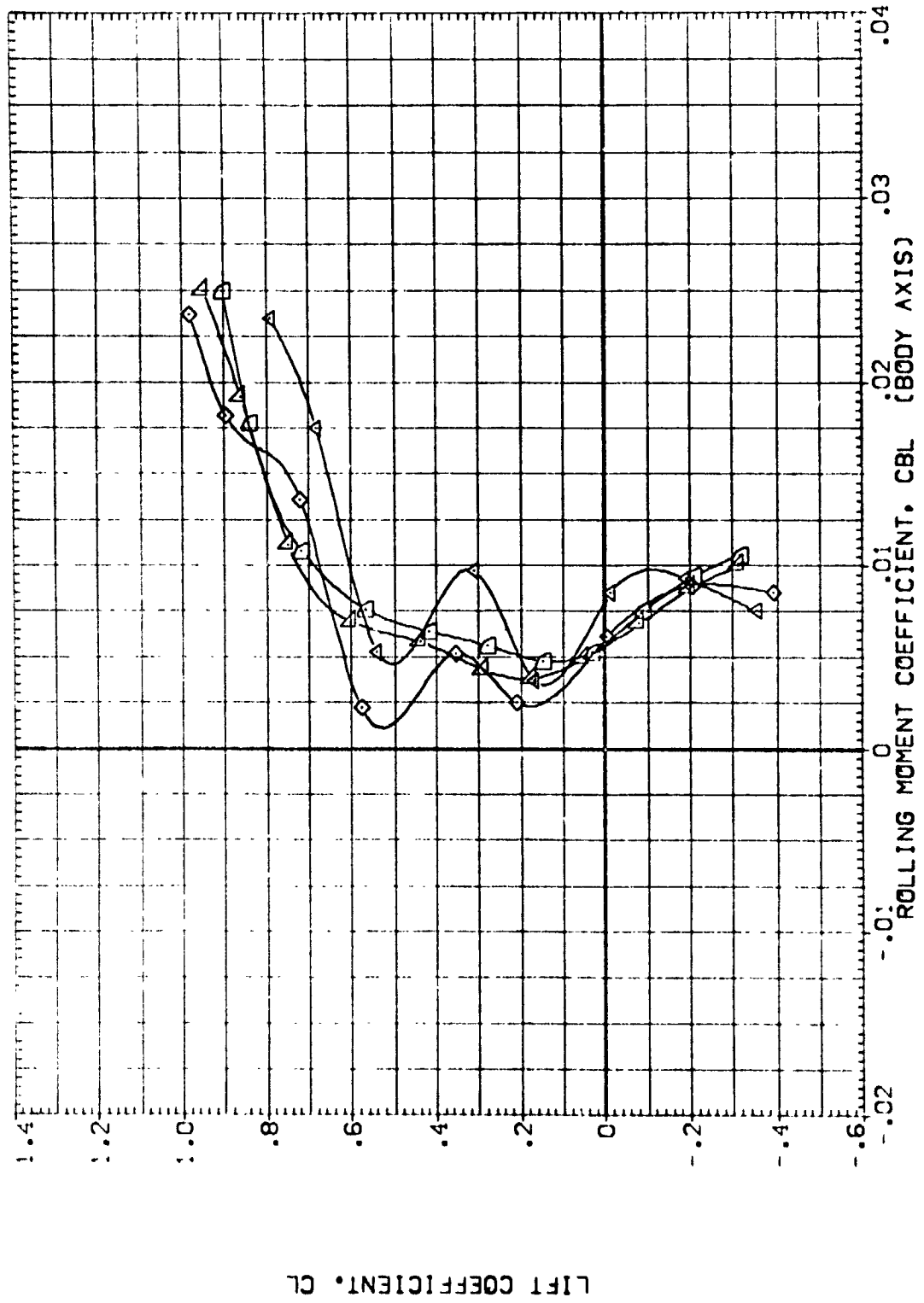


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (000001) DATA NOT AVAILABLE  
 (000002) DATA NOT AVAILABLE  
 (000003) 5 B2  
 (000004) 16 B2  
 (000005) 16 B2  
 (000006) 16 B2

LAMBDA BETA  
 .000 .000  
 .000 .000  
 .000 .000  
 .000 .000  
 .000 .000  
 .000 .000

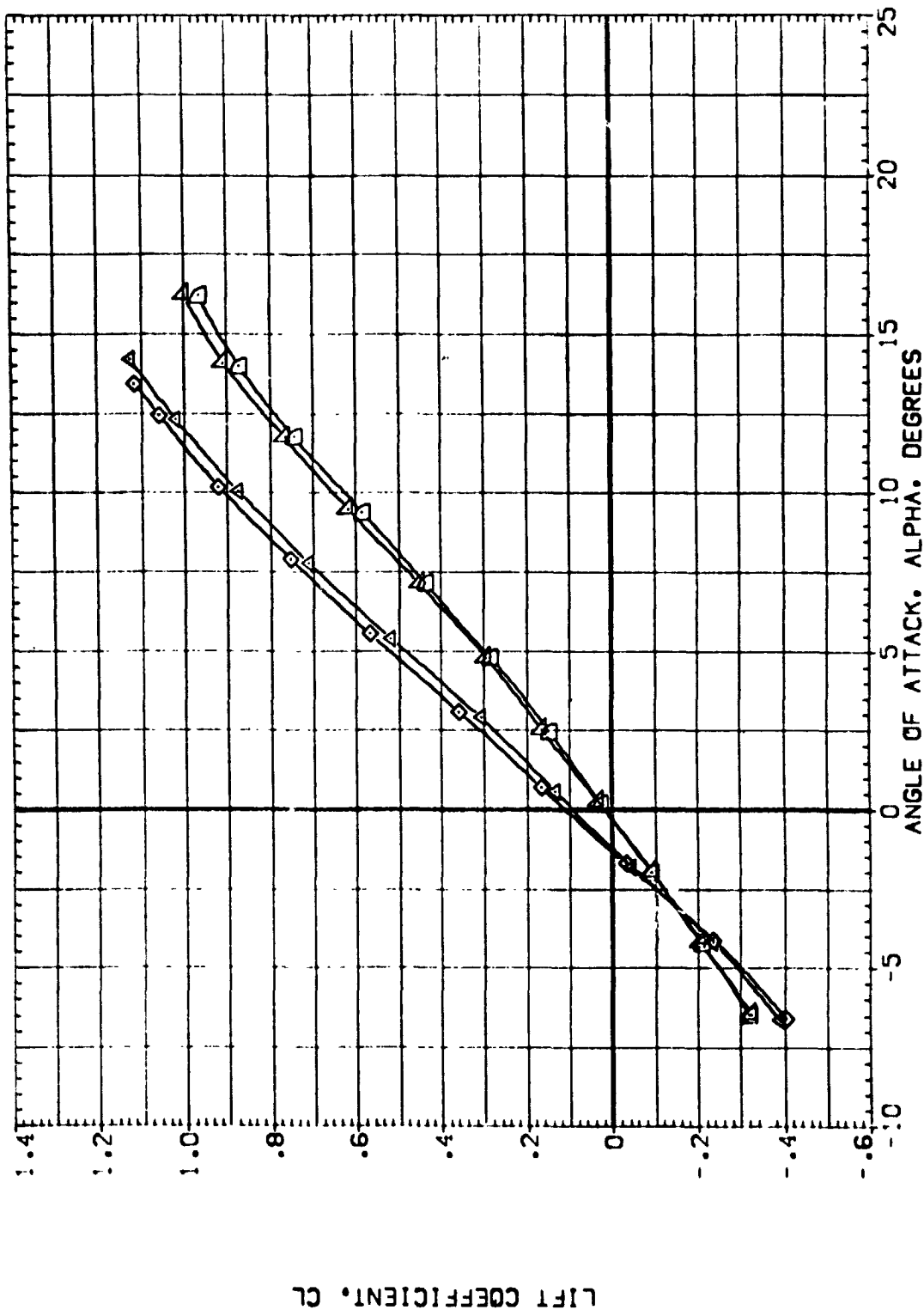


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(F)WACH = .05



DATA SET SYMBOL. CONFIGURATION DESCRIPTION  
 [REDACTED] DATA NOT AVAILABLE  
 [REDACTED] DATA NOT AVAILABLE  
 [REDACTED] 15.32  
 [REDACTED] 16.32  
 [REDACTED] 18.32  
 [REDACTED] 20.32

LAMBDA BETA  
 .000 .000  
 .000 .000  
 .000 .000  
 .000 .000  
 .000 .000  
 .000 .000

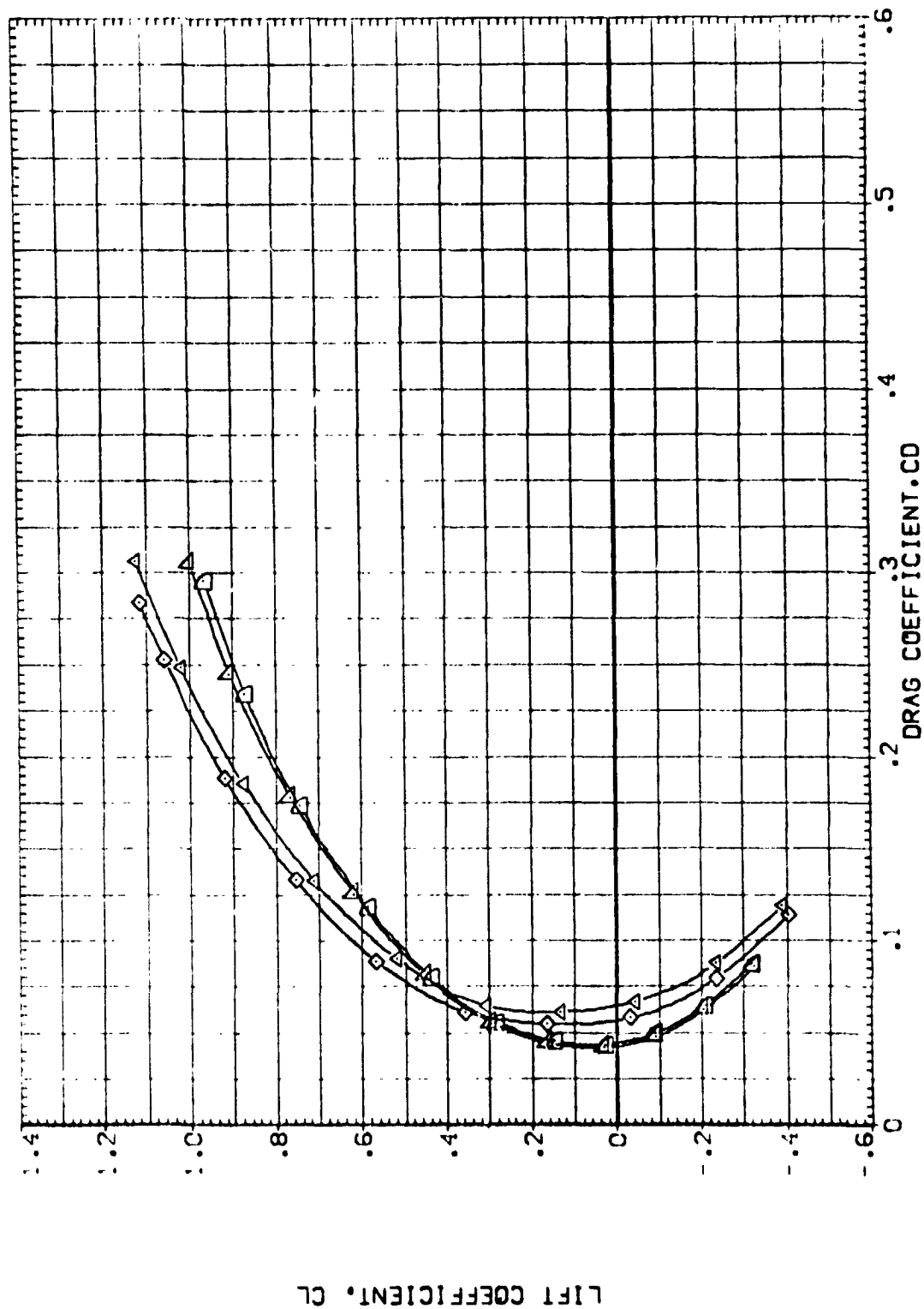


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(F)MAC = 1.05

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (05-0001) DATA NOT AVAILABLE  
 (05-0002) DATA NOT AVAILABLE  
 (05-0003) V5 B2 Y  
 (05-0004) V6 B2 Y  
 (05-0005) V5 B2 Y  
 (05-0006) V6 B2 Y

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000

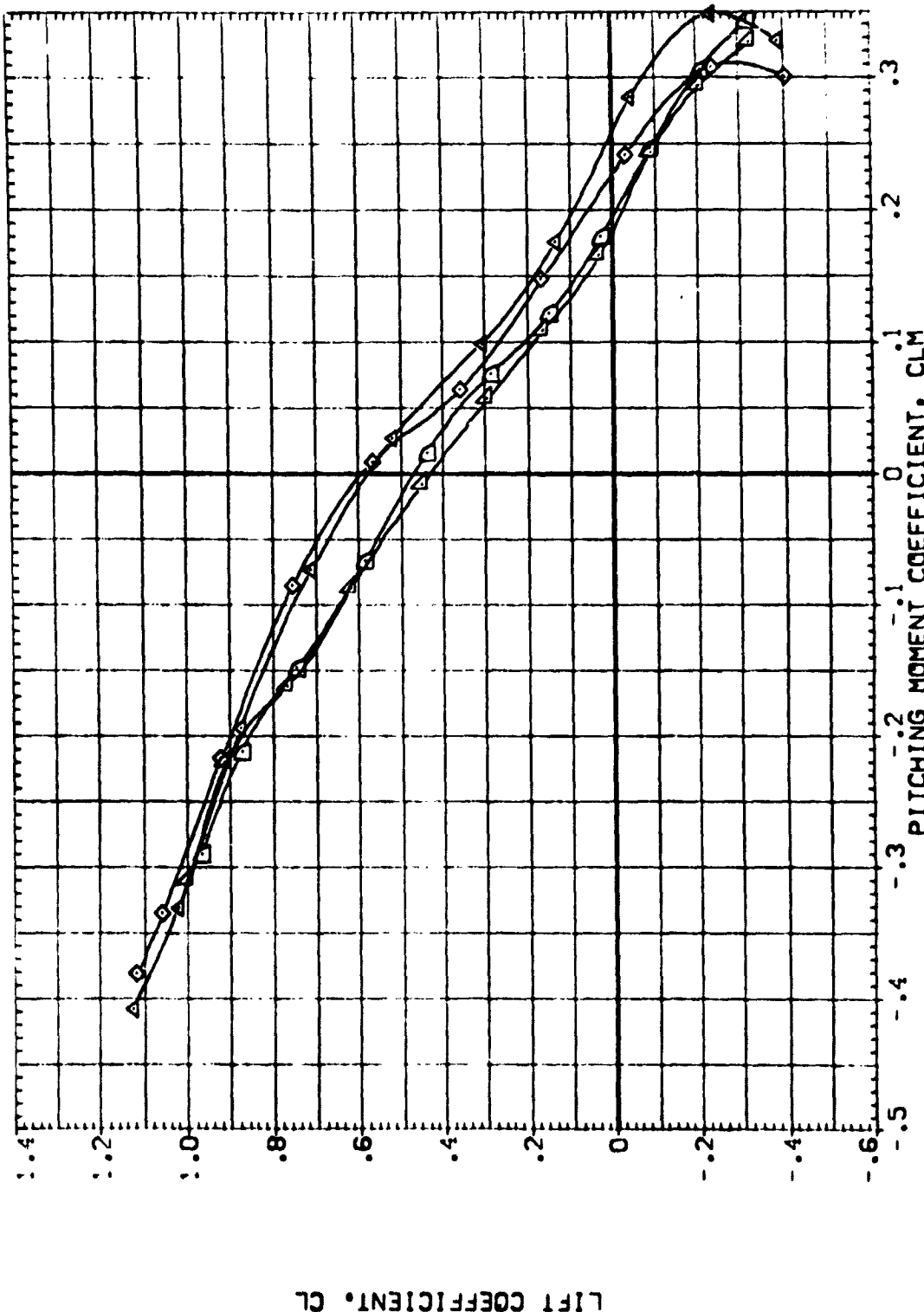


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.  
 (F)MACH = .05

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (REFJ001) DATA NOT AVAILABLE  
 (REFJ002) DATA NOT AVAILABLE  
 (REFJ003) V5 B2 Y  
 (REFJ004) V6 B2 Y  
 (REFJ005) V5 B2 Y  
 (REFJ006) V6 B2 Y

LAMBDA BETA  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000

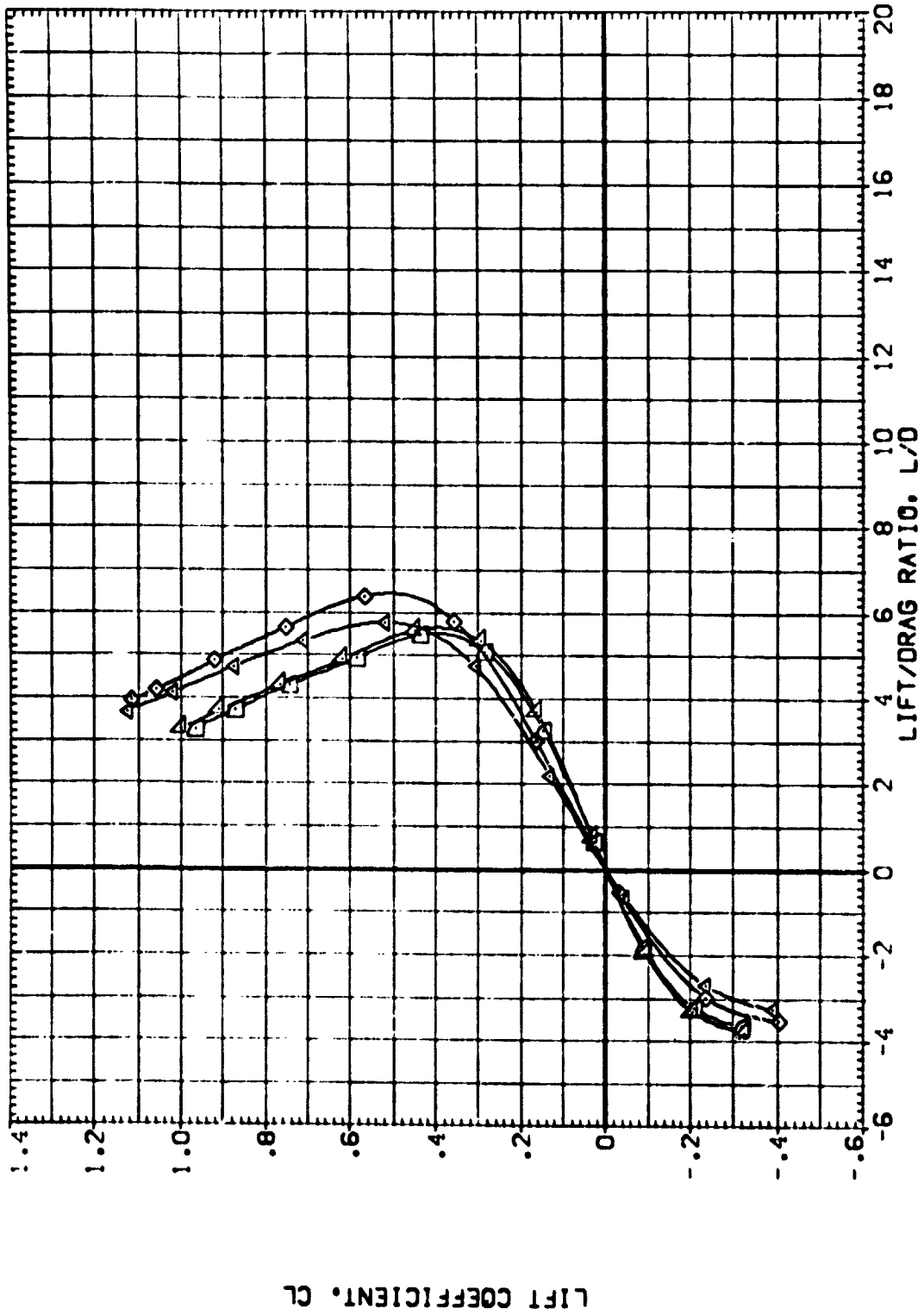


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(F)MACH = 1.05

DATA SET SYMB. CONFIGURATION DESCRIPTION  
 [RF-0001] DATA NOT AVAILABLE  
 [RF-0002] DATA NOT AVAILABLE  
 [RF-0003] VS B2 T  
 [RF-0004] VS B2 T  
 [RF-0005] VS B2 T  
 [RF-0006] VS B2 T

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000

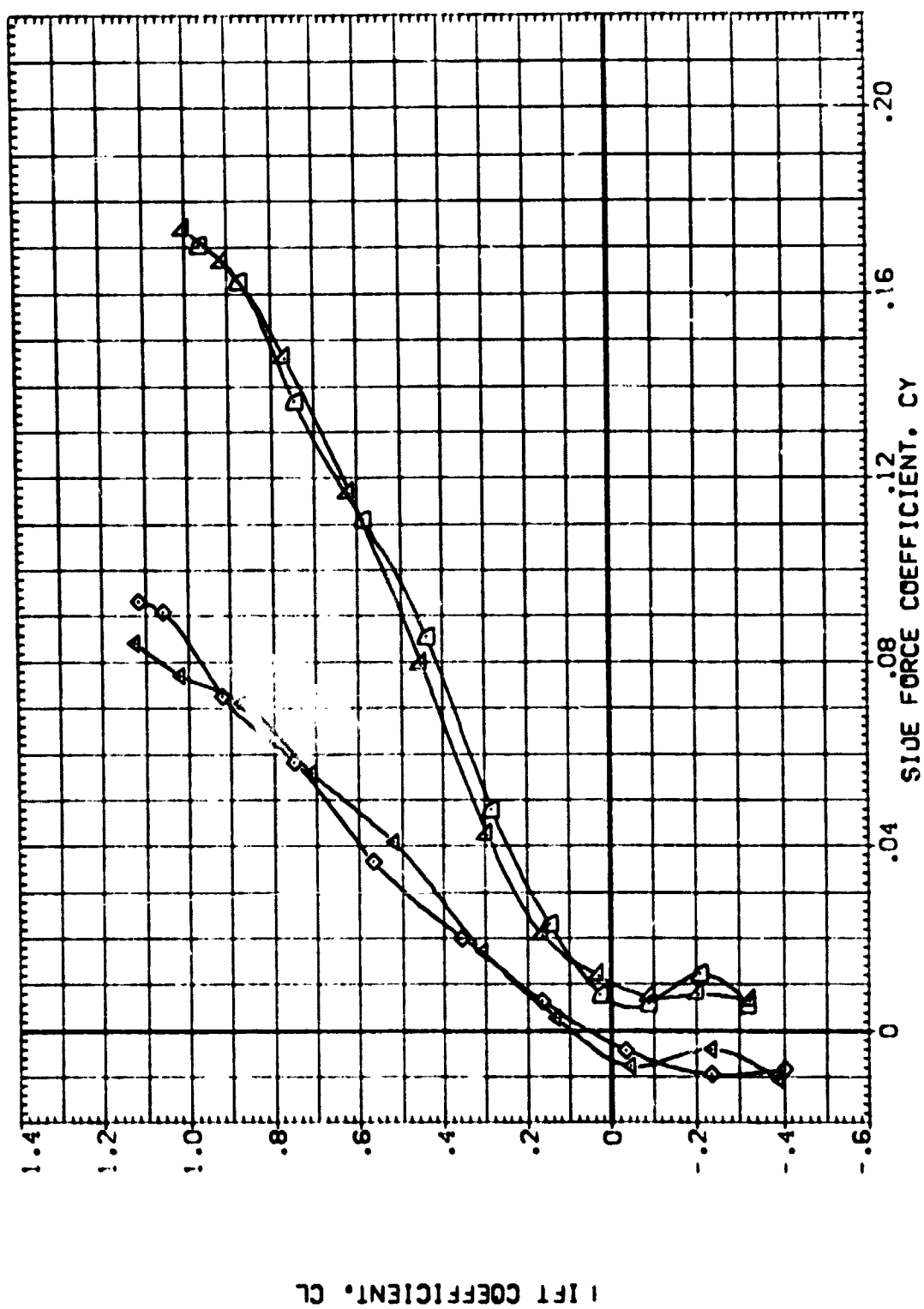


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.  
 (F)MACH = 1.05

LAMBDA	BETA
.000	.000
.000	.000
15.000	.000
15.000	.000
60.000	.000
60.000	.000

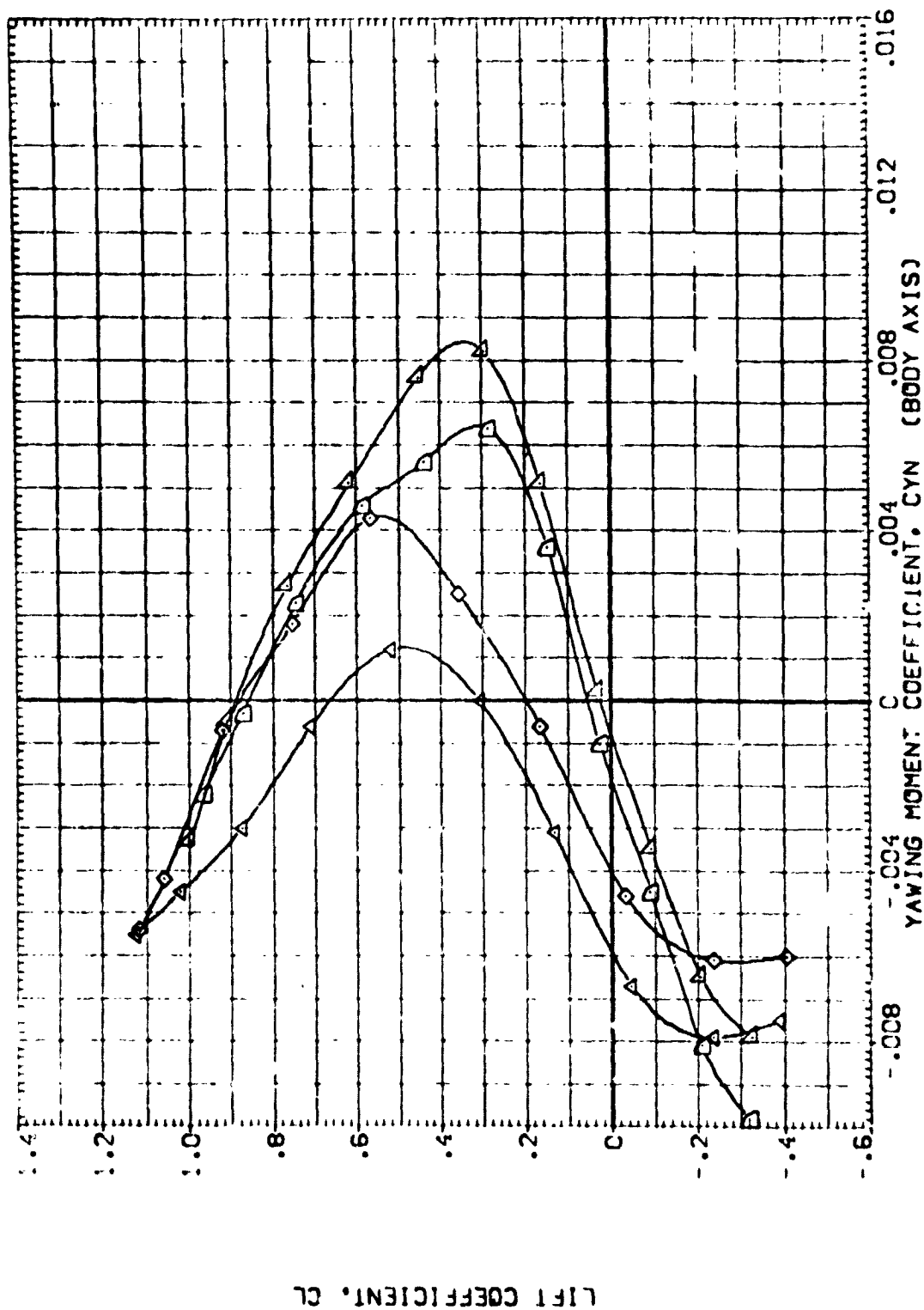


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

$$C_{\text{max}} = 1.05$$

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [REF:001] DATA NOT AVAILABLE  
 [REF:002] DATA NOT AVAILABLE  
 [REF:003] VS 52 Y  
 [REF:004] VS 52 Y  
 [REF:005] VS 52 Y  
 [REF:006] VS 52 Y

LAMDA BETA  
 .000 .000  
 .000 .000  
 .45 .000  
 .45 .000  
 .60 .000  
 .60 .000

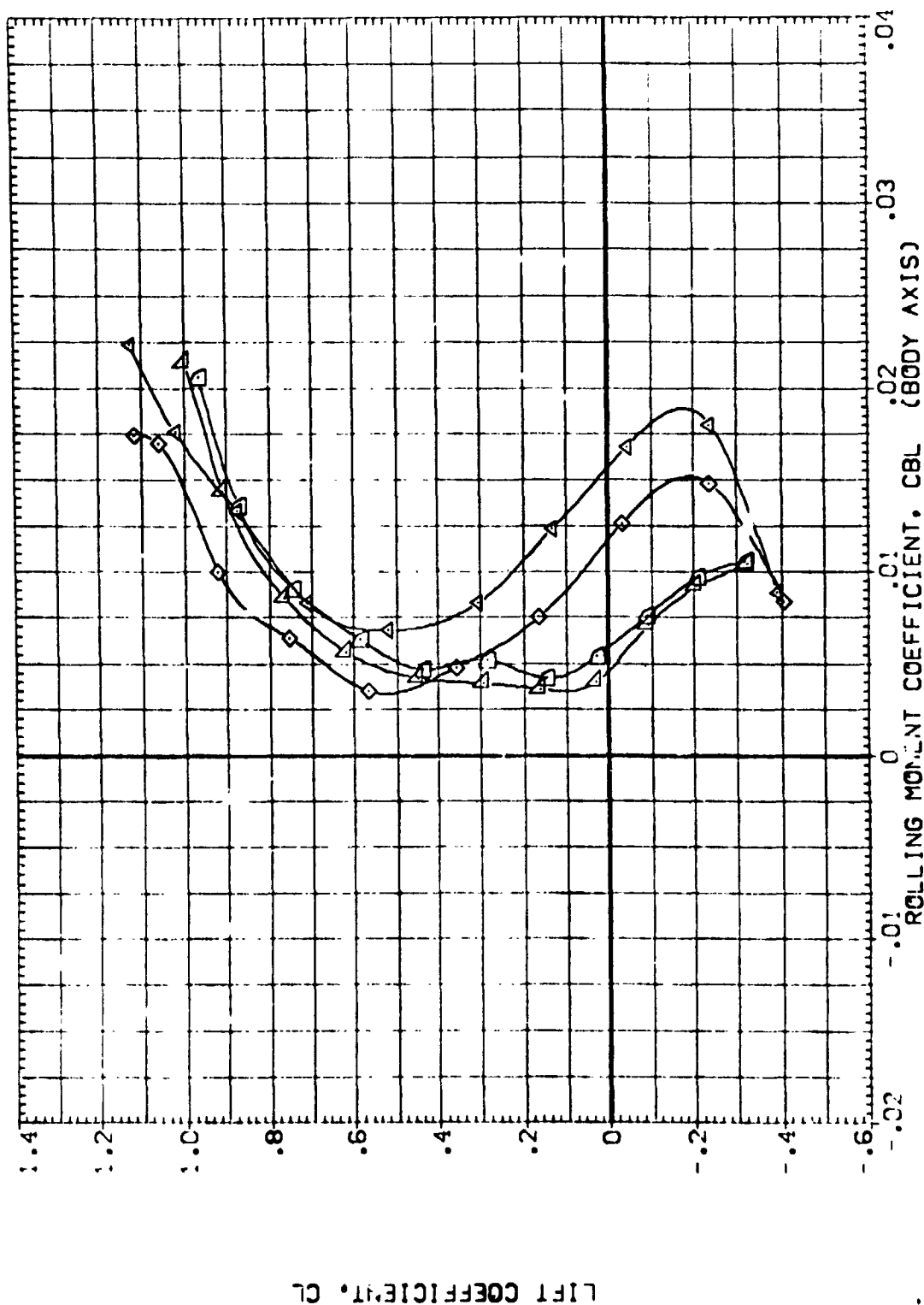


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(F)VACH = 1.05

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (REF:001) Q DATA NOT AVAILABLE  
 (REF:002) X DATA NOT AVAILABLE  
 (REF:003) Z DATA NOT AVAILABLE  
 (REF:004) DATA NOT AVAILABLE  
 (REF:005) VS BZ  
 (REF:006) VS BZ

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000  
 60.000 .000

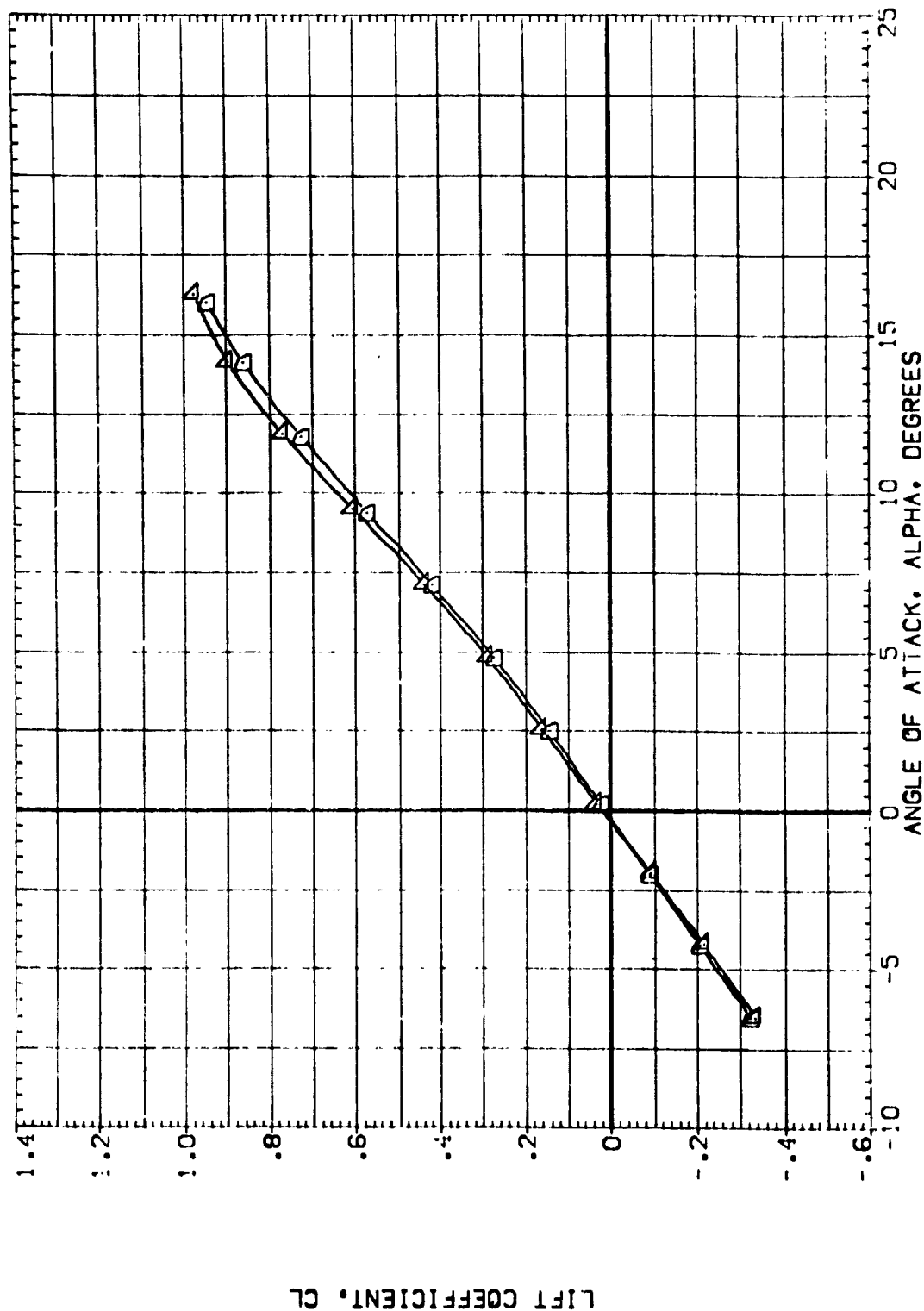


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(S)MAC = 1.0

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 {#1001} DATA NOT AVAILABLE  
 {#1002} DATA NOT AVAILABLE  
 {#1003} DATA NOT AVAILABLE  
 {#1004} DATA NOT AVAILABLE  
 {#1005} VS B2  
 {#1006} VS B2

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 60.000 .000  
 60.000 .000

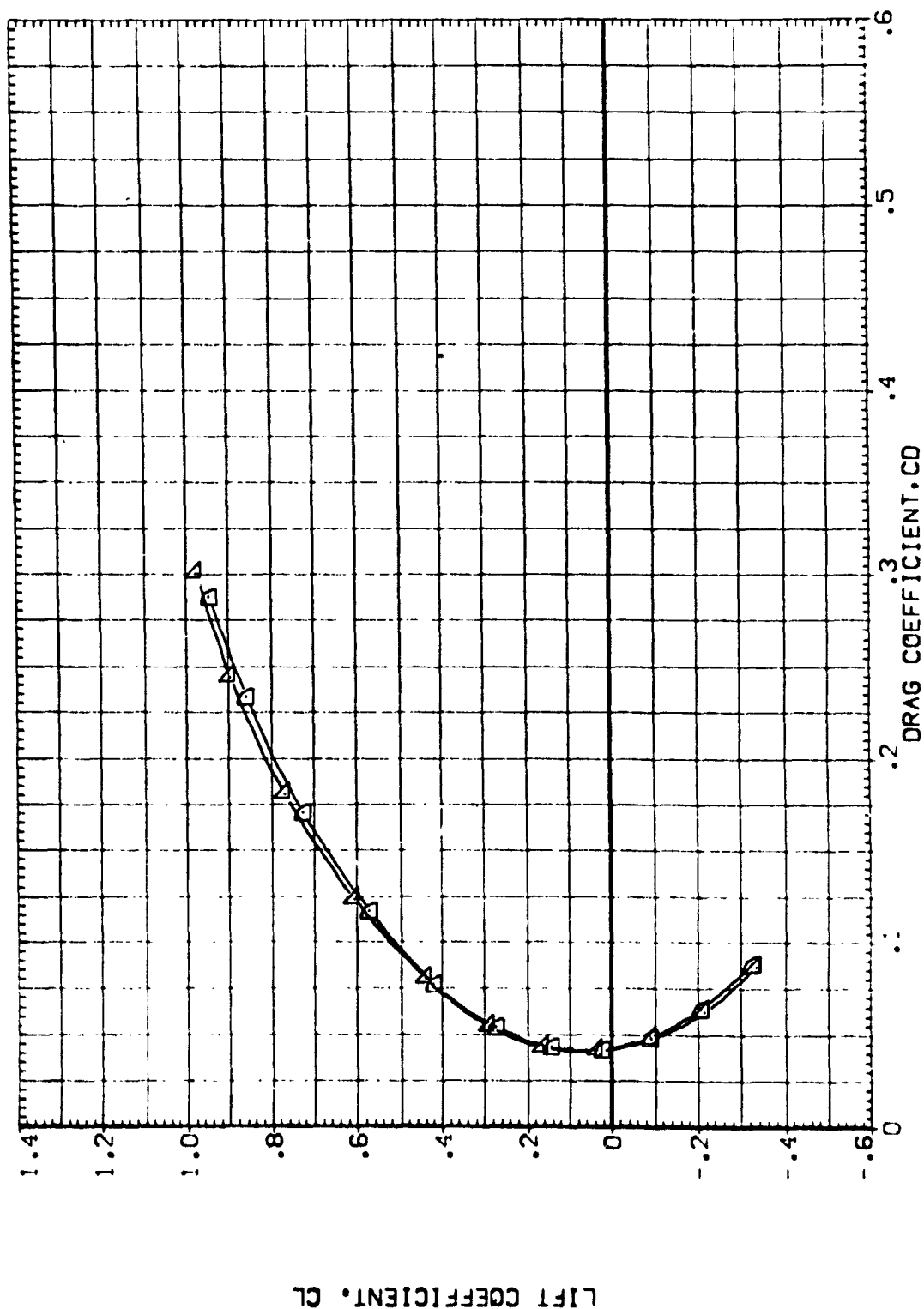


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(G)MAC = 1.10



LAMBDA	BETA
.000	.000
.000	.000
45.000	.000
45.000	.000
60.000	.000
60.000	.000

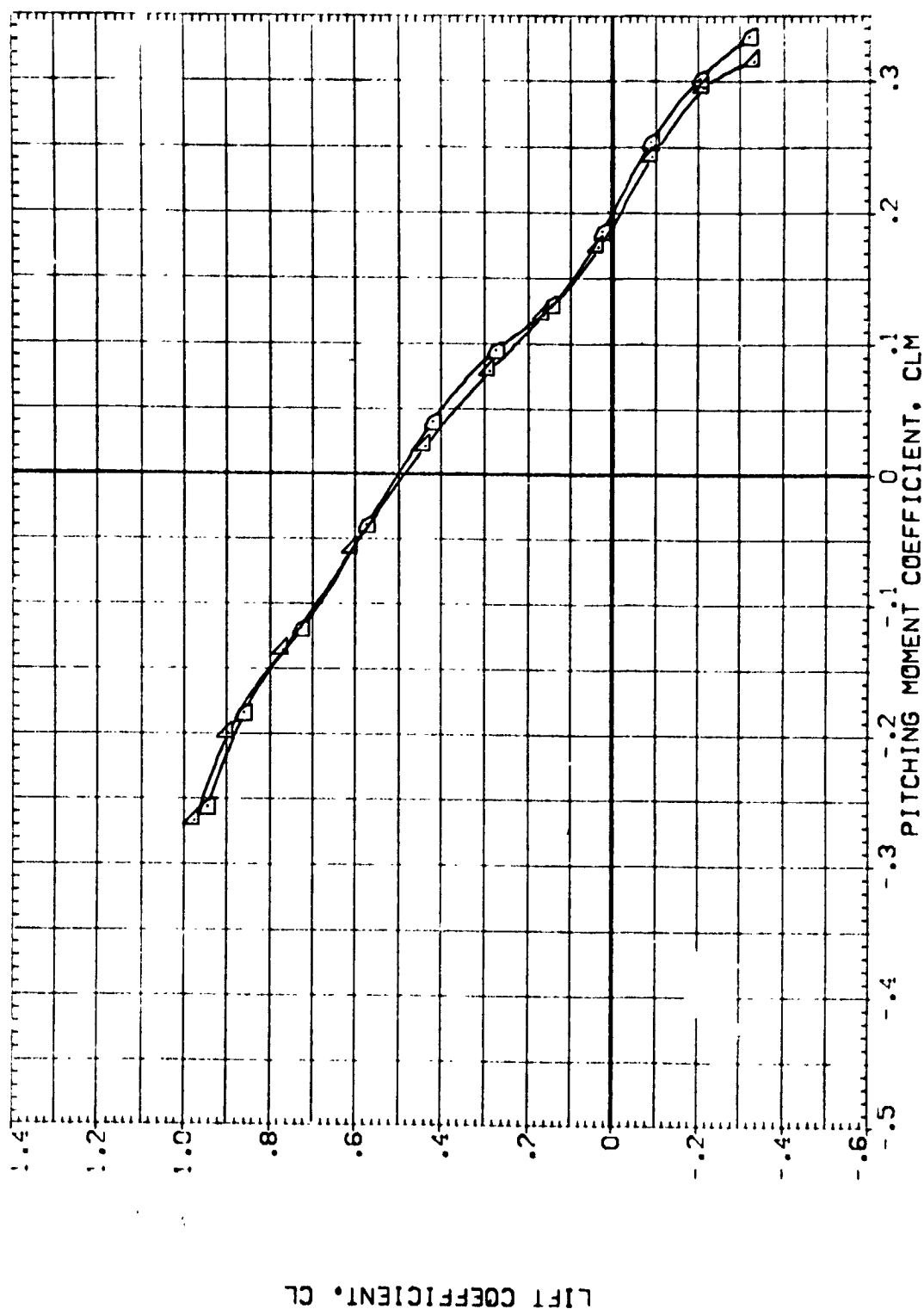


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(#1:001)	DATA NOT AVAILABLE
(#1:002)	DATA NOT AVAILABLE
(#1:003)	DATA NOT AVAILABLE
(#1:004)	DATA NOT AVAILABLE
(#1:005)	15 B2
(#1:006)	16 B2

LAMBDA	BETA
.000	.000
.000	.000
.000	.000
45.000	.000
45.000	.000
60.000	.000
60.000	.000

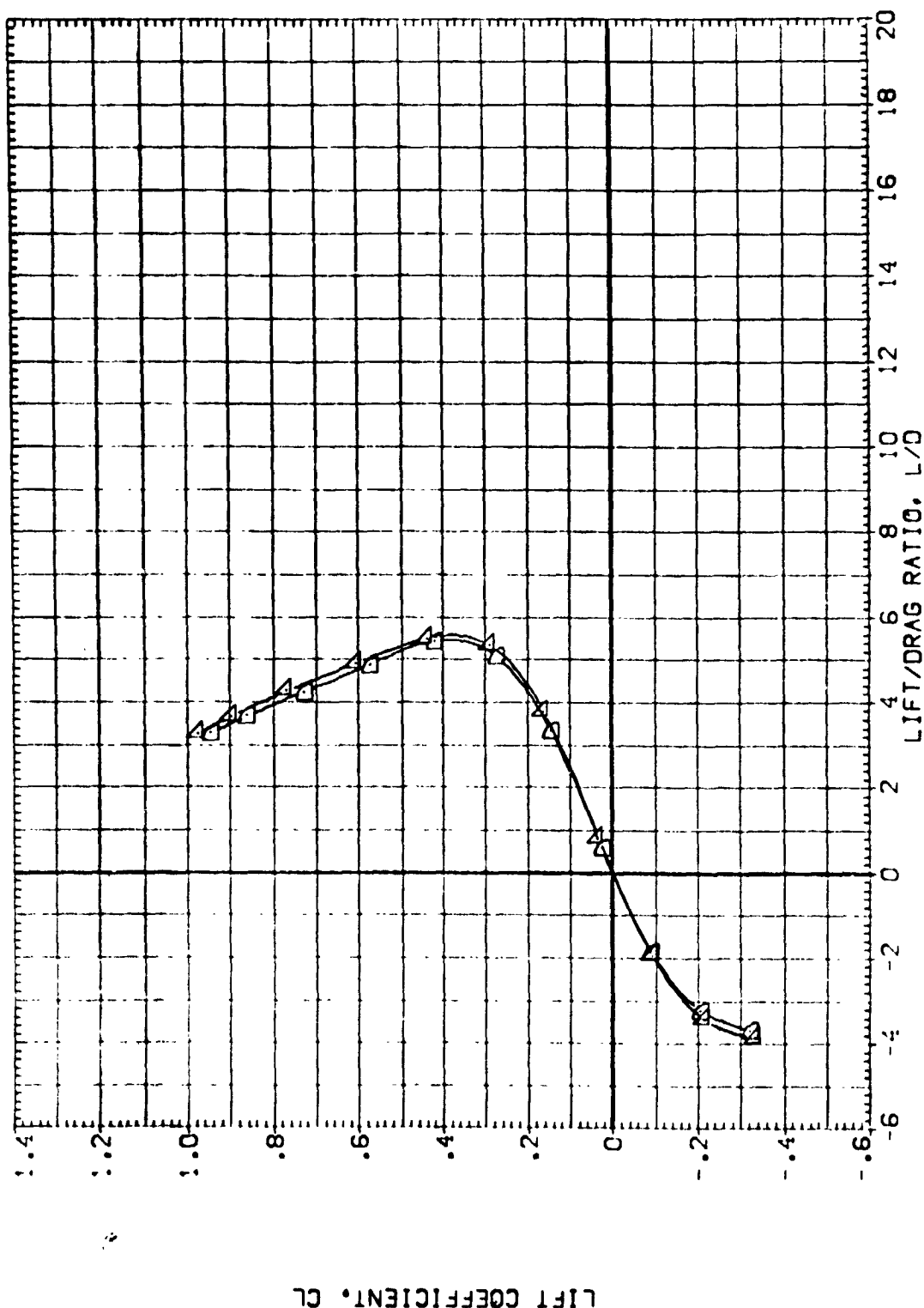


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(S)MAC = 1.13

DATA SET 5: CUL  
 (REF 001)  
 (REF 002)  
 (REF 003)  
 (REF 004)  
 (REF 005)  
 (REF 006)  
 (REF 007)  
 (REF 008)  
 (REF 009)  
 (REF 010)  
 (REF 011)  
 (REF 012)  
 (REF 013)  
 (REF 014)  
 (REF 015)  
 (REF 016)  
 (REF 017)  
 (REF 018)  
 (REF 019)  
 (REF 020)  
 (REF 021)  
 (REF 022)  
 (REF 023)  
 (REF 024)  
 (REF 025)  
 (REF 026)  
 (REF 027)  
 (REF 028)  
 (REF 029)  
 (REF 030)  
 (REF 031)  
 (REF 032)  
 (REF 033)  
 (REF 034)  
 (REF 035)  
 (REF 036)  
 (REF 037)  
 (REF 038)  
 (REF 039)  
 (REF 040)  
 (REF 041)  
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 (REF 058)  
 (REF 059)  
 (REF 060)  
 (REF 061)  
 (REF 062)  
 (REF 063)  
 (REF 064)  
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 (REF 067)  
 (REF 068)  
 (REF 069)  
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 (REF 088)  
 (REF 089)  
 (REF 090)  
 (REF 091)  
 (REF 092)  
 (REF 093)  
 (REF 094)  
 (REF 095)  
 (REF 096)  
 (REF 097)  
 (REF 098)  
 (REF 099)  
 (REF 100)

LAMBDA BETA  
 .000 .000  
 .000 .000  
 .45 .000 .000  
 .45 .000 .000  
 .60 .000 .000  
 .60 .000 .000

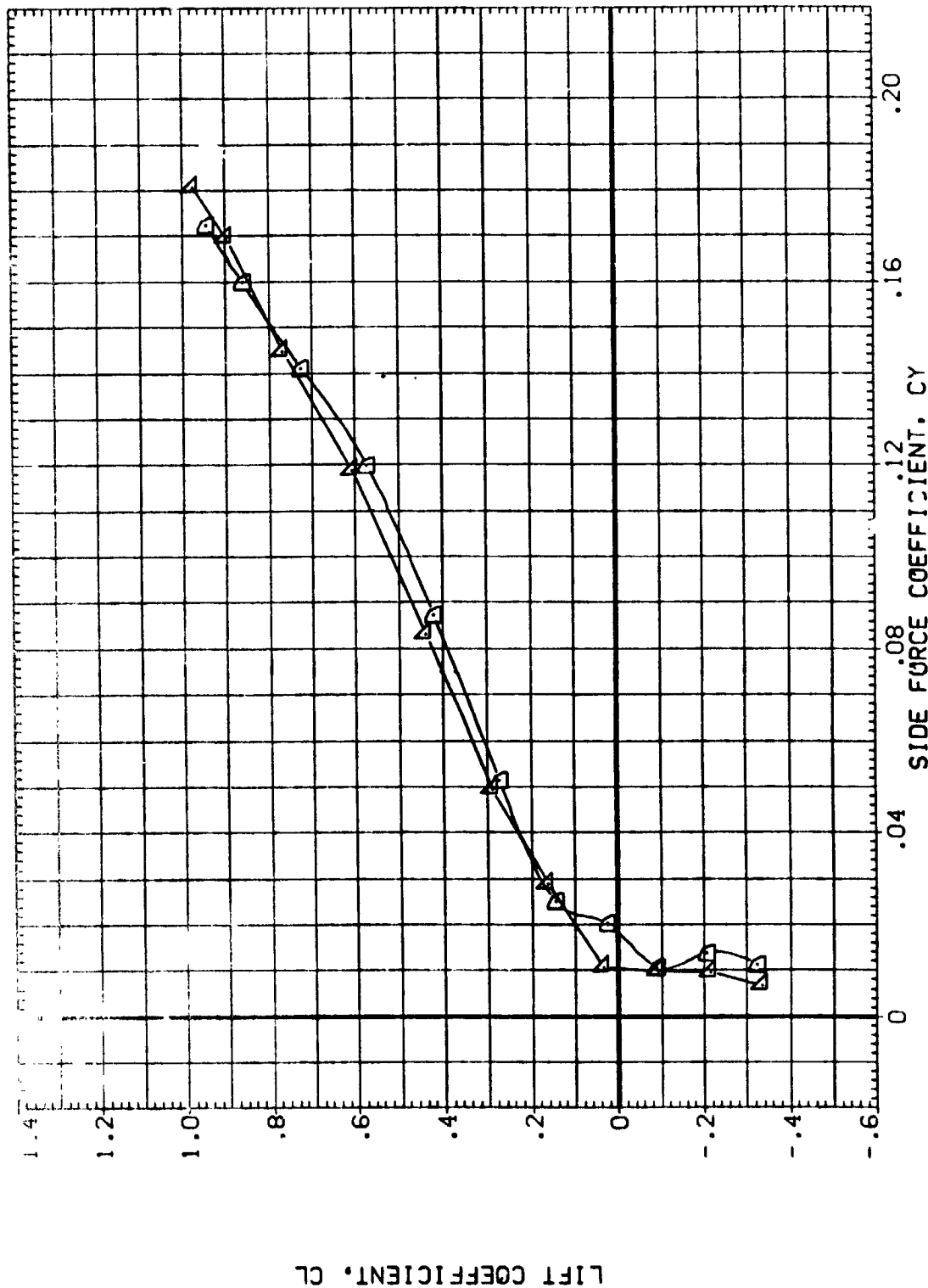


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.  
 (G)MACH = 1.10

DATA SET SYMB    CONFIGURATION DESCRIPTION  
 [REFJ001]    Q    DATA NOT AVAILABLE  
 [REFJ002]    X    DATA NOT AVAILABLE  
 [REFJ003]    Z    DATA NOT AVAILABLE  
 [REFJ004]       DATA NOT AVAILABLE  
 [REFJ005]       VS B2 T  
 [REFJ006]       VS B2 T

LAMBDA    BETA  
 .000    .000  
 .000    .000  
 45.000    .000  
 45.000    .000  
 60.000    .000

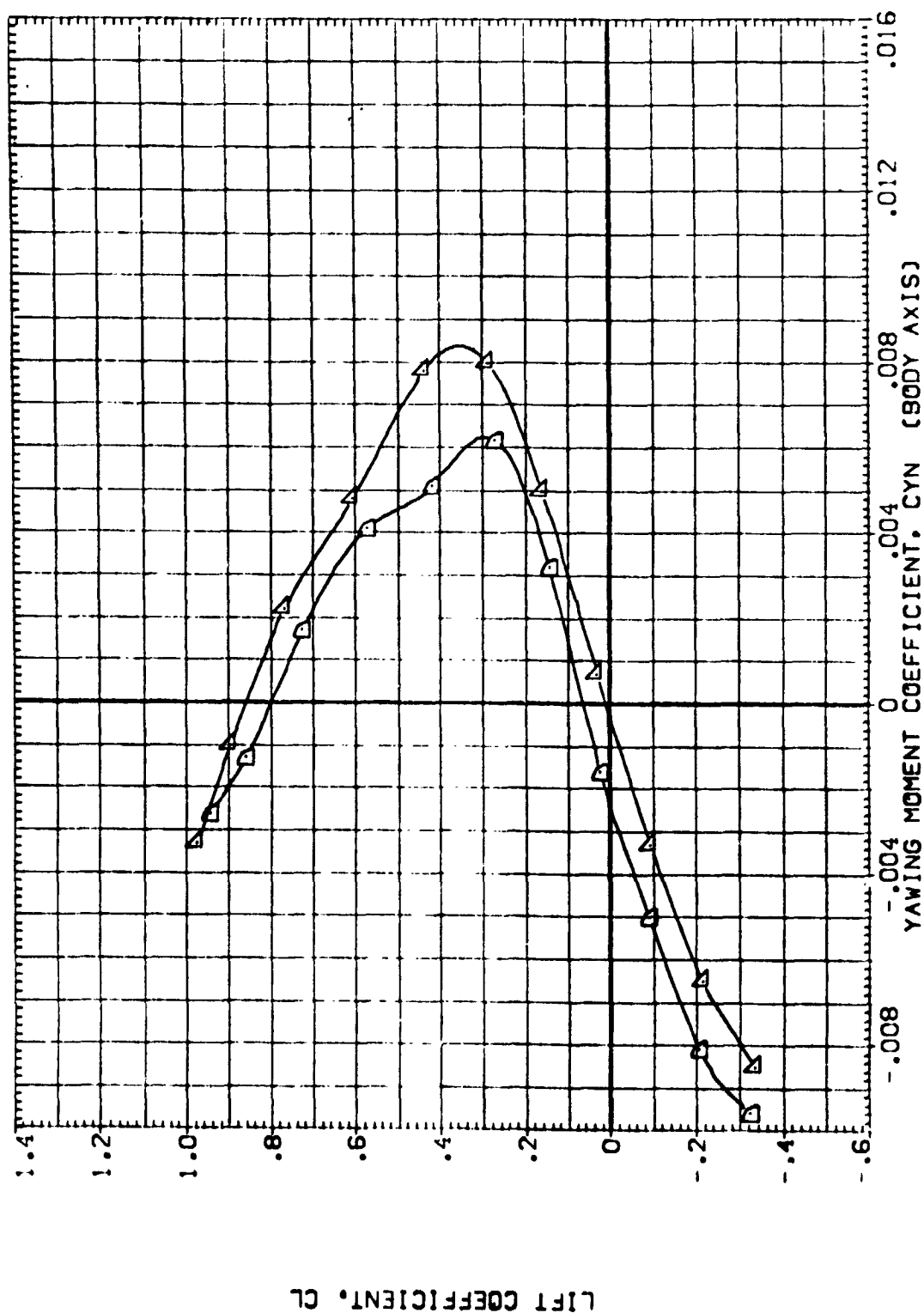


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(G)MACH = 1.10

LAMBDA	BETA
.000	.000
.000	.000
45.000	.000
45.000	.000
60.000	.000
60.000	.000

FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RE:001] DATA NOT AVAILABLE  
 [RE:002] DATA NOT AVAILABLE  
 [RE:003] DATA NOT AVAILABLE  
 [RE:004] DATA NOT AVAILABLE  
 [RE:005] VS B2  
 [RE:006] VS B2

LAMDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000

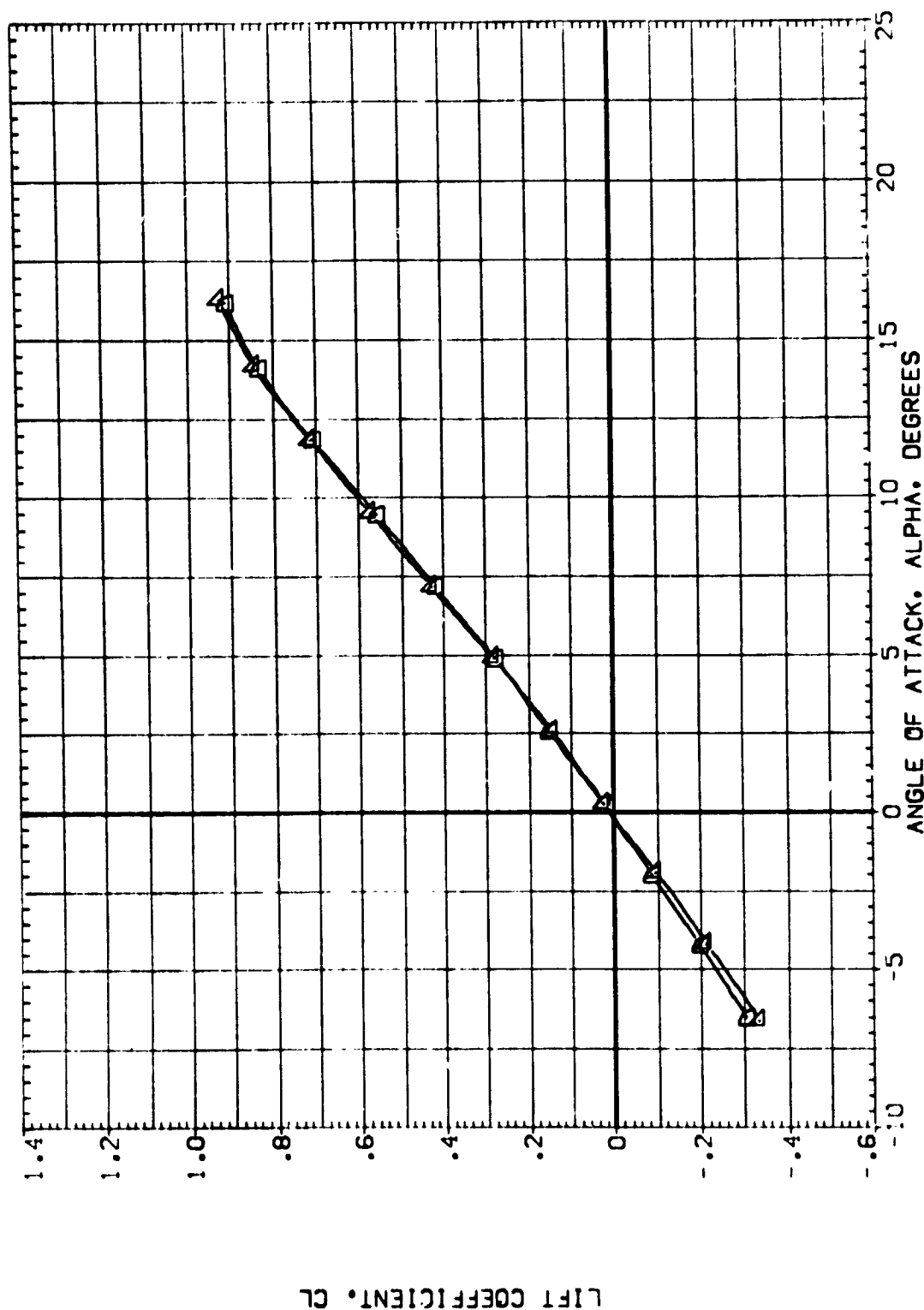


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

[RE:]MACH = 1.20

DATA SET SYMBO. CONFIGURATION DESCRIPTION  
 (REF-1001) DATA NOT AVAILABLE  
 (REF-1002) DATA NOT AVAILABLE  
 (REF-1003) DATA NOT AVAILABLE  
 (REF-1004) DATA NOT AVAILABLE  
 (REF-1005) 1/5 B2 1  
 (REF-1006) 1/6 B2 1

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000

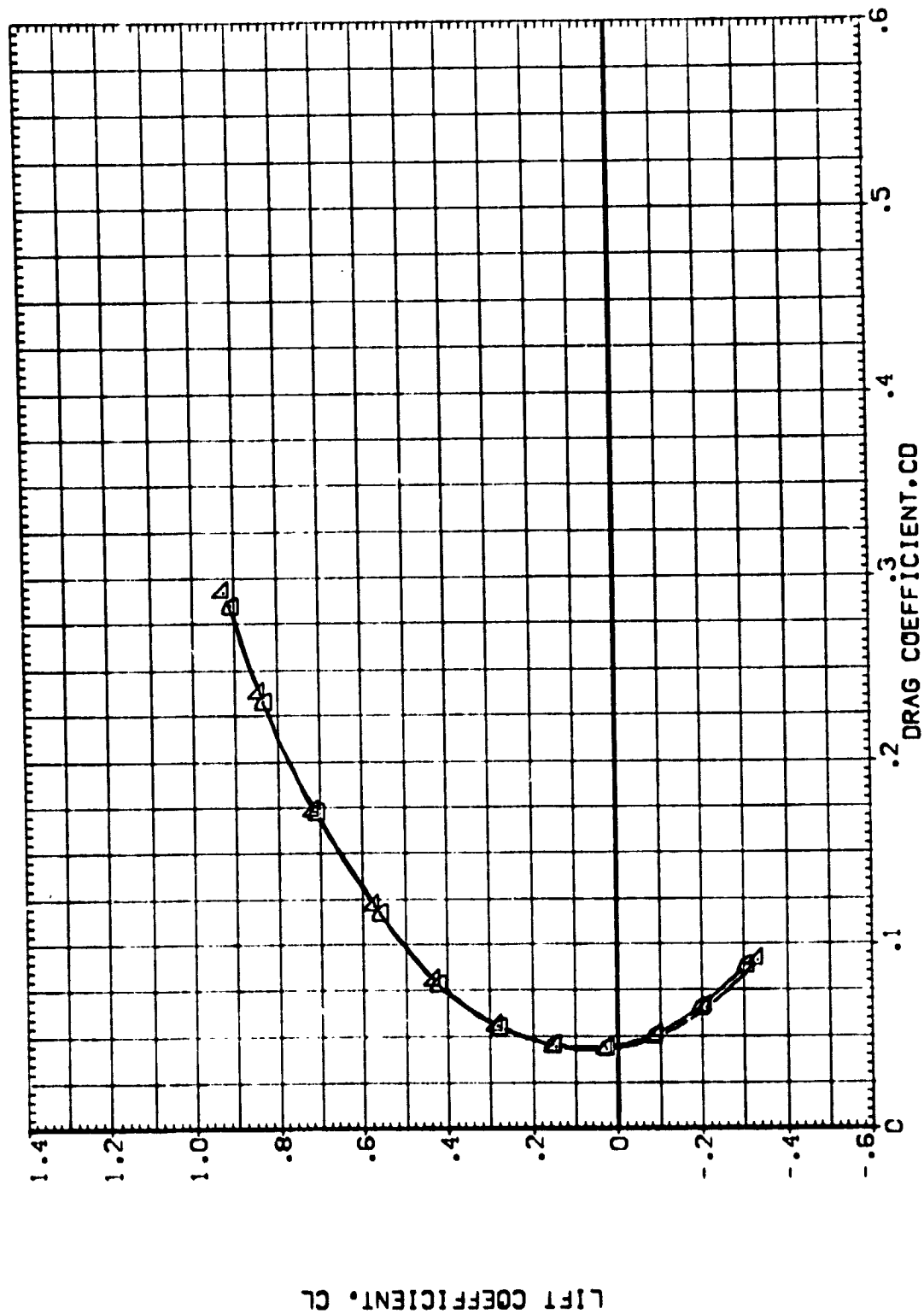


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.  
 (H)MACH = 1.20

DATA SET SYMBOL      CONFIGURATION DESCRIPTION  
 (REF-0001)      DATA NOT AVAILABLE  
 (REF-0002)      DATA NOT AVAILABLE  
 (REF-0003)      DATA NOT AVAILABLE  
 (REF-0004)      DATA NOT AVAILABLE  
 (REF-0005)      V6 B2  
 (REF-0006)      V6 B2

LAMBDA      BETA  
 .000      .000  
 .000      .000  
 45.000      .000  
 45.000      .000  
 60.000      .000

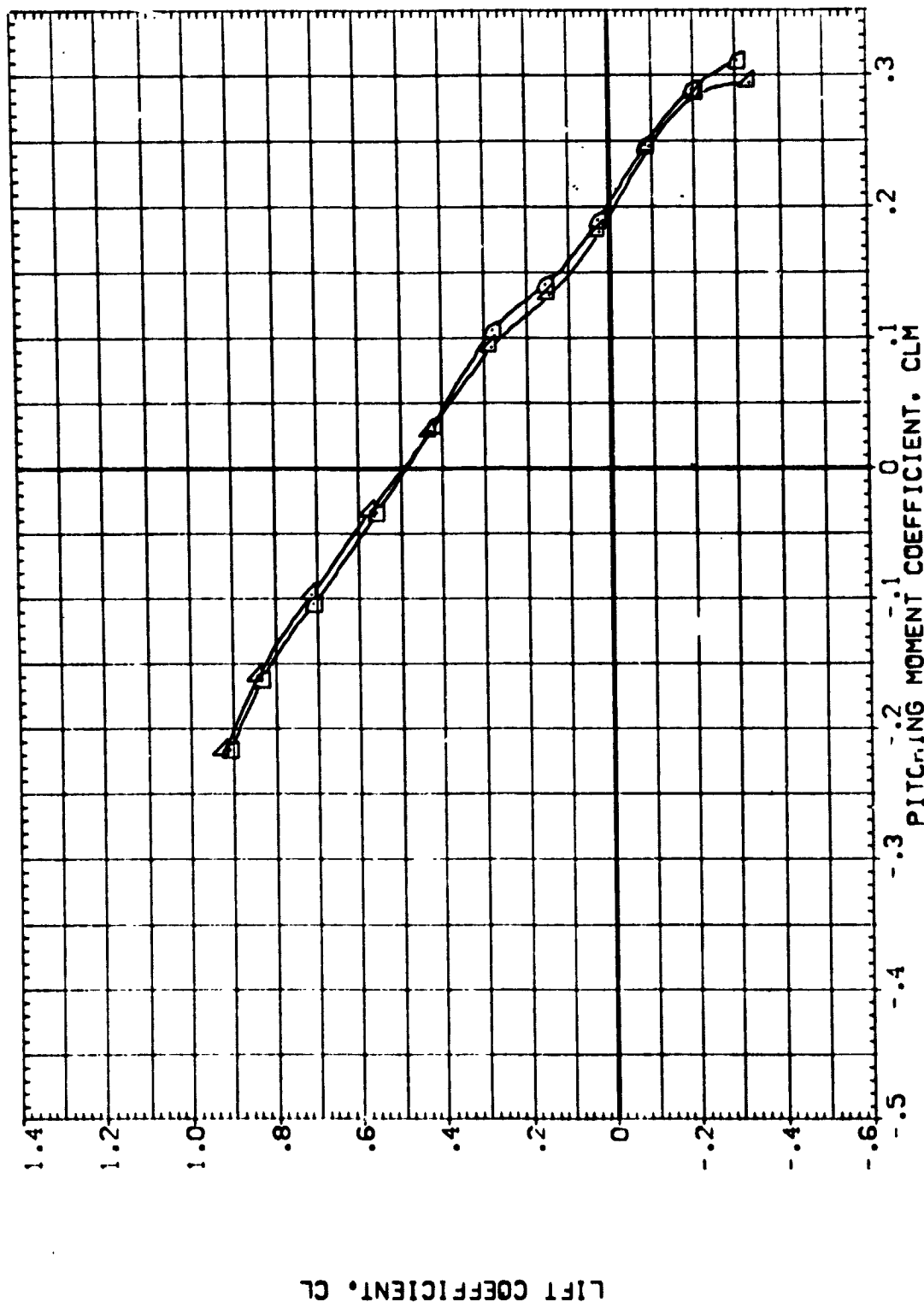


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(M)MACH = 1.20



LAMPOA	BETA
.000	.000
.000	.000
45.000	.000
45.000	.000
60.000	.000
60.000	.000

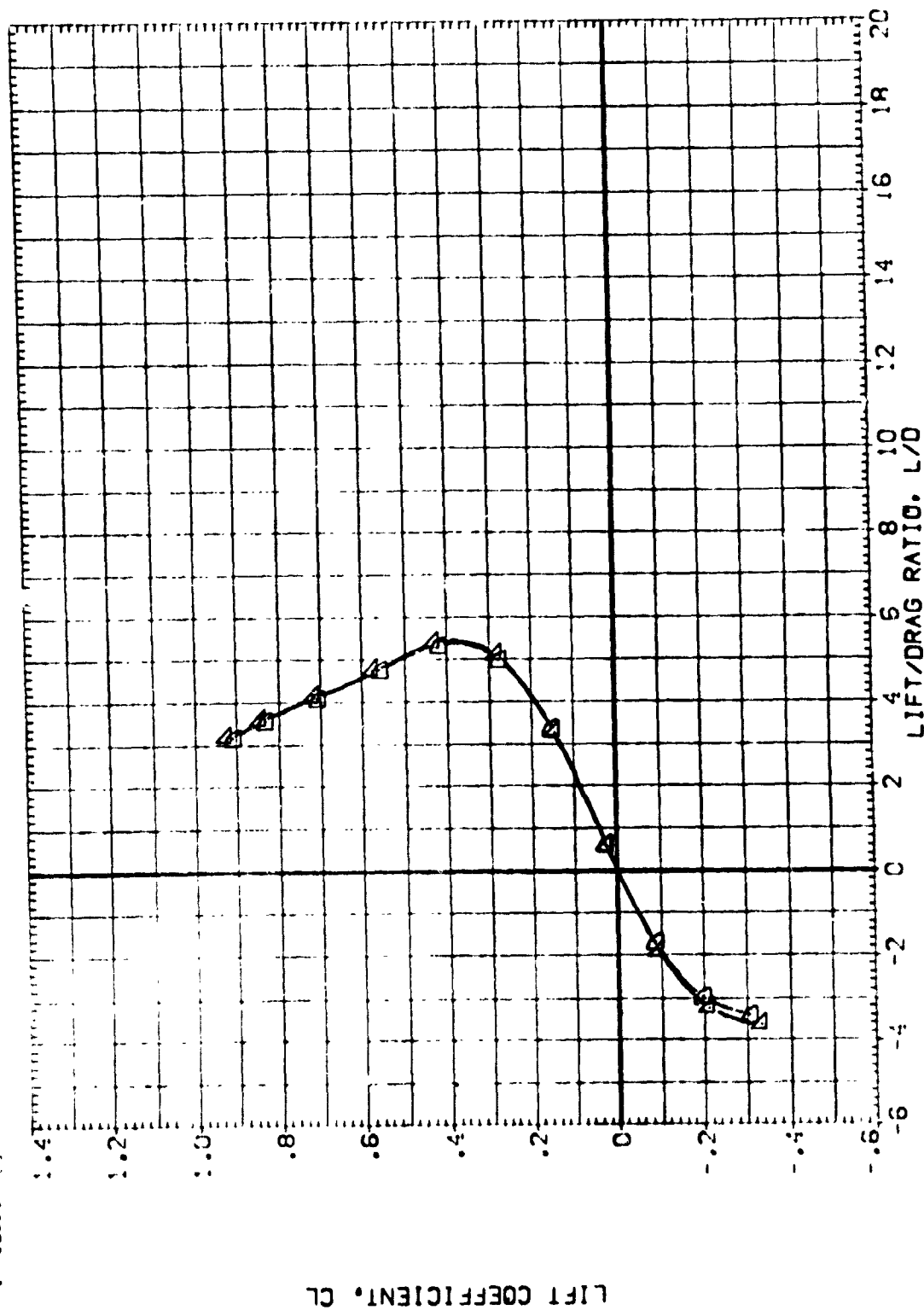


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

120

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (REF 1001) DATA NOT AVAILABLE  
 (REF 1002) DATA NOT AVAILABLE  
 (REF 1003) DATA NOT AVAILABLE  
 (REF 1004) DATA NOT AVAILABLE  
 (REF 1005) VS B2 T  
 (REF 1006) VS B2

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000  
 60.000 .000

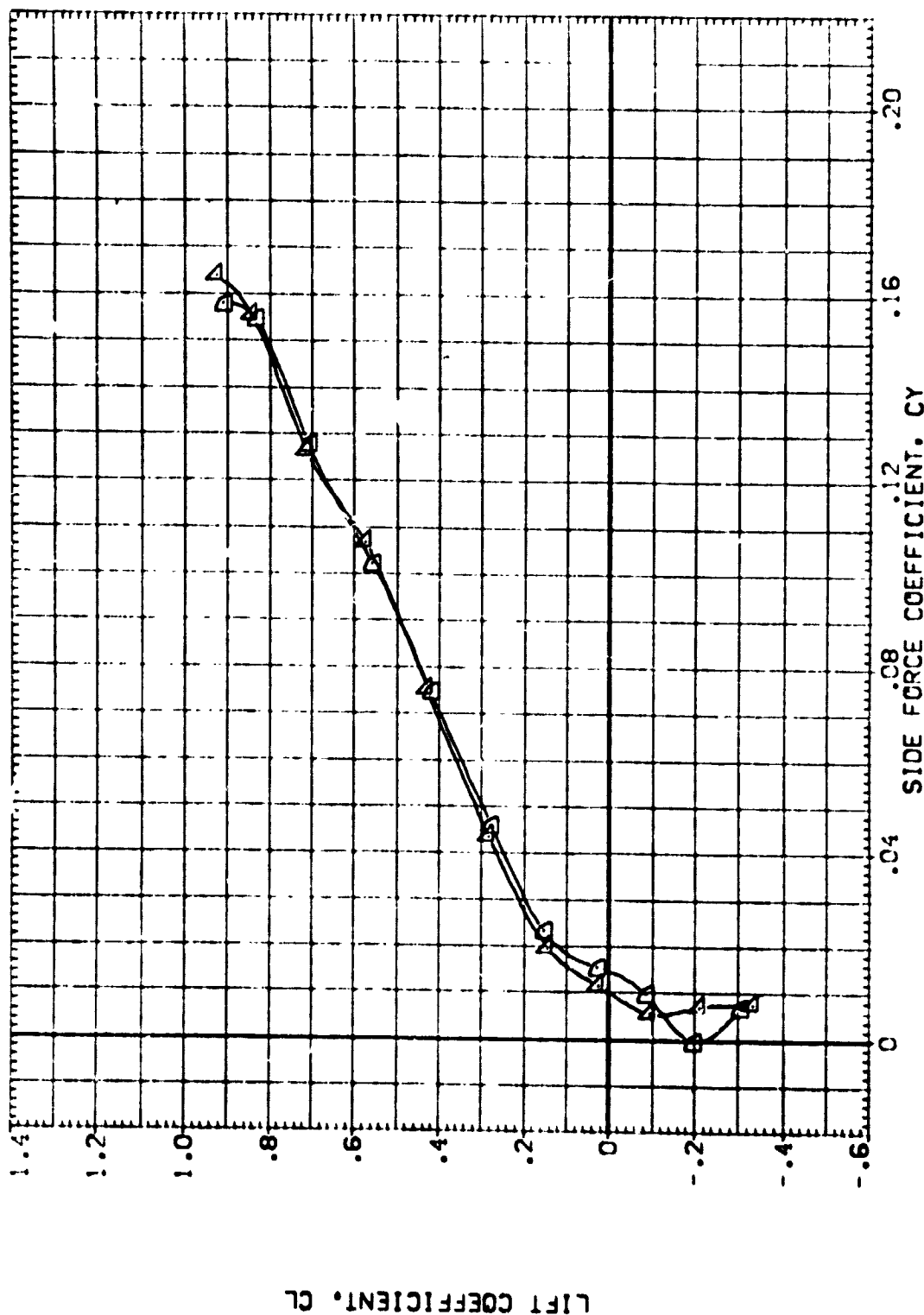


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.  
 (M)MAC = 1.20

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (REF-1001) DATA NOT AVAILABLE  
 (REF-1002) DATA NOT AVAILABLE  
 (REF-1003) DATA NOT AVAILABLE  
 (REF-1004) DATA NOT AVAILABLE  
 (REF-1005) VS B2 Y  
 (REF-1006) VS B2 Y

LAMDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000

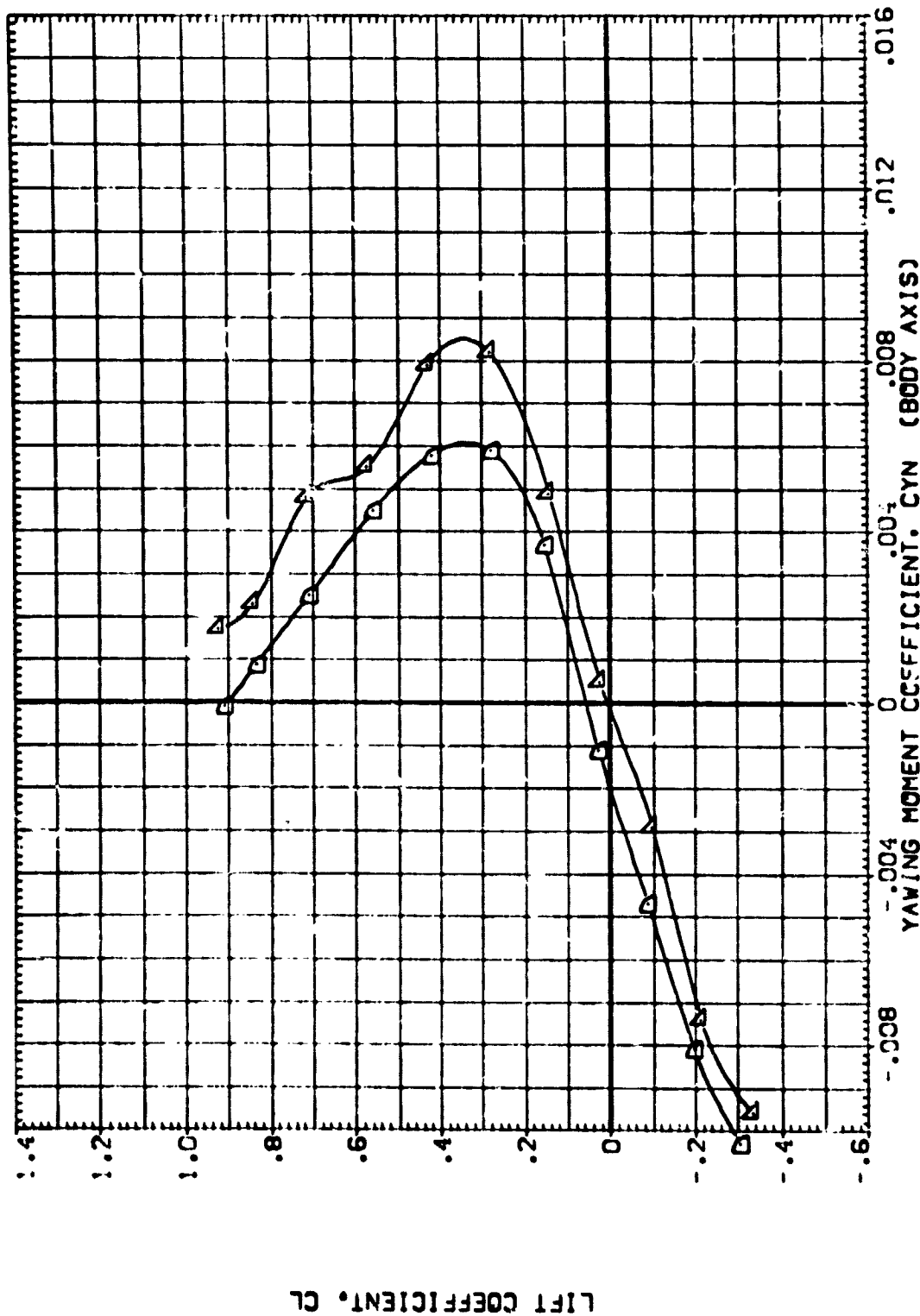


FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(H)MAC = 1.20

DATA SET SYMBO. CONFIGURATION DESCRIPTION:

[R-1001] DATA NOT AVAILABLE  
 [R-1002] DATA NOT AVAILABLE  
 [R-1003] DATA NOT AVAILABLE  
 [R-1004] DATA NOT AVAILABLE  
 [R-1005] V5 B2 1  
 [R-1006] V6 B2 1

LAMBDA BETA  
 .000 .000  
 .000 .000  
 45.000 .000  
 45.000 .000  
 60.000 .000  
 60.000 .000

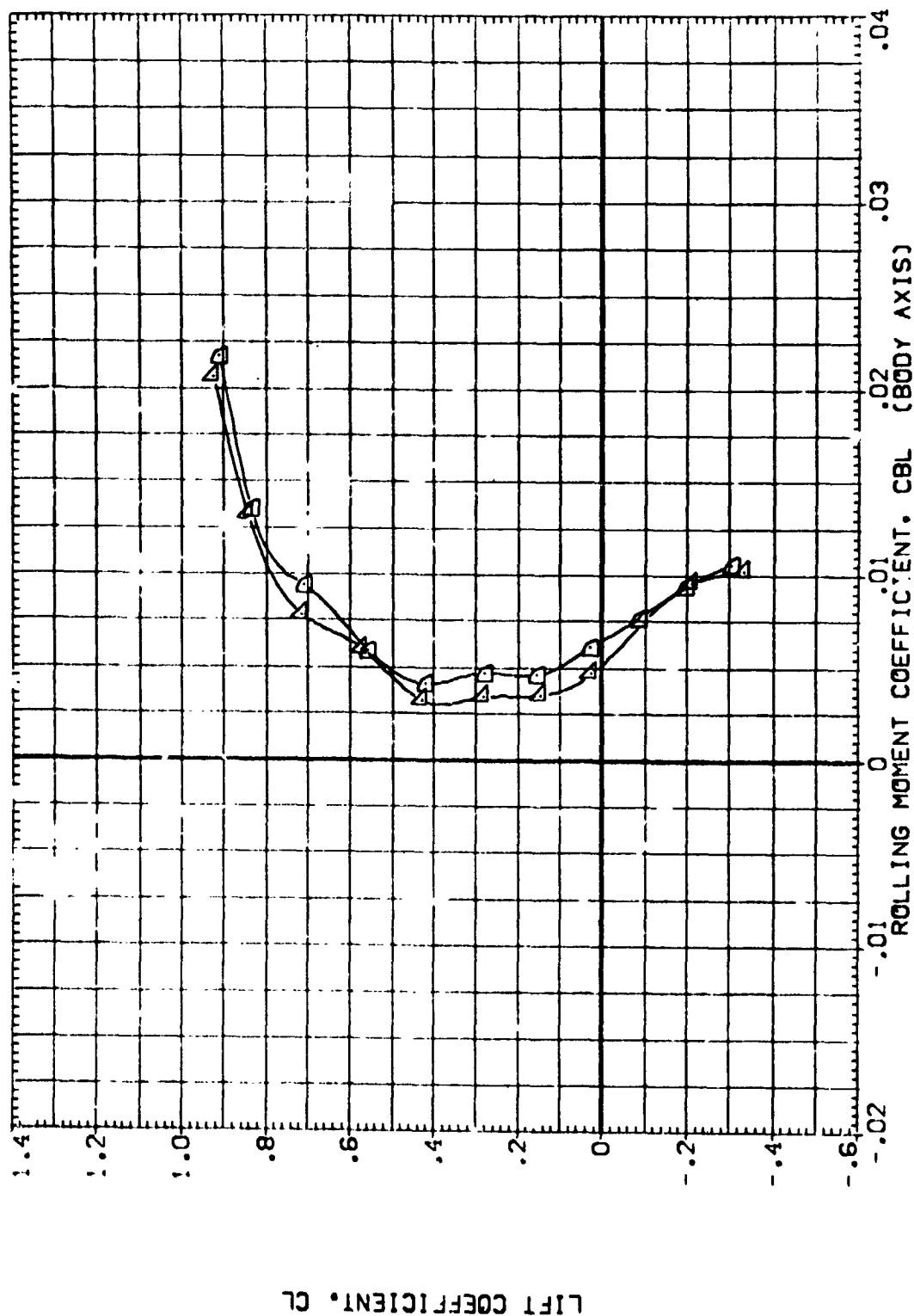


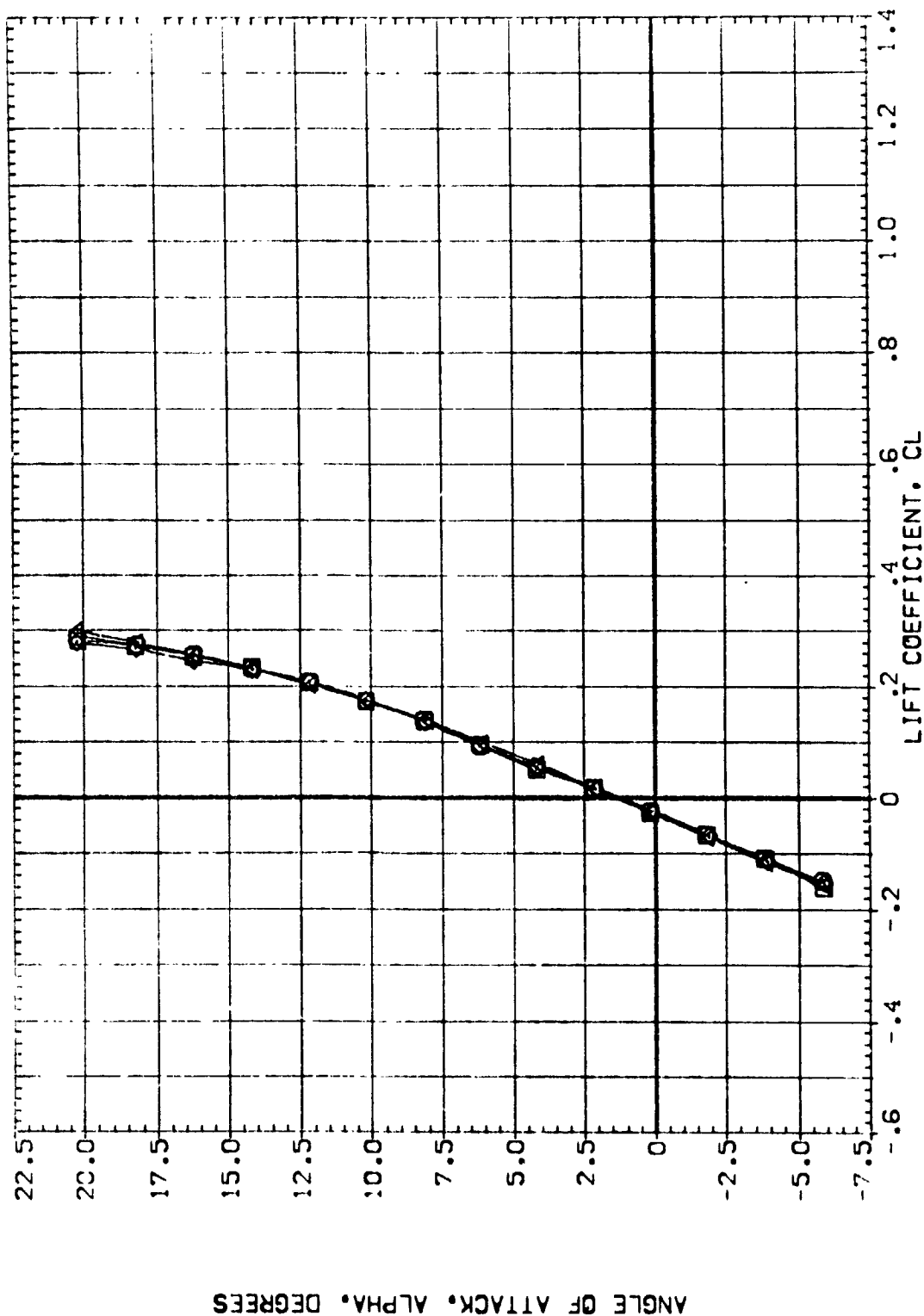
FIGURE 4. AERO. CHARACTERISTICS IN PITCH- COMPARISON OF 12 AND 14-PERCENT WINGS.

(H)MACH = 1.20

(ZFJ007)

B2

SYMBOL MA IN BETA PARAMETRIC VALUES  
1.001  
.701  
.801  
.901



(ZFJ007)

R2 \*

PARAMETRIC VALUES

BETA

.000

MACH

.982

1.052

1.101

1.201

SYMBOL

○

□

◇

△

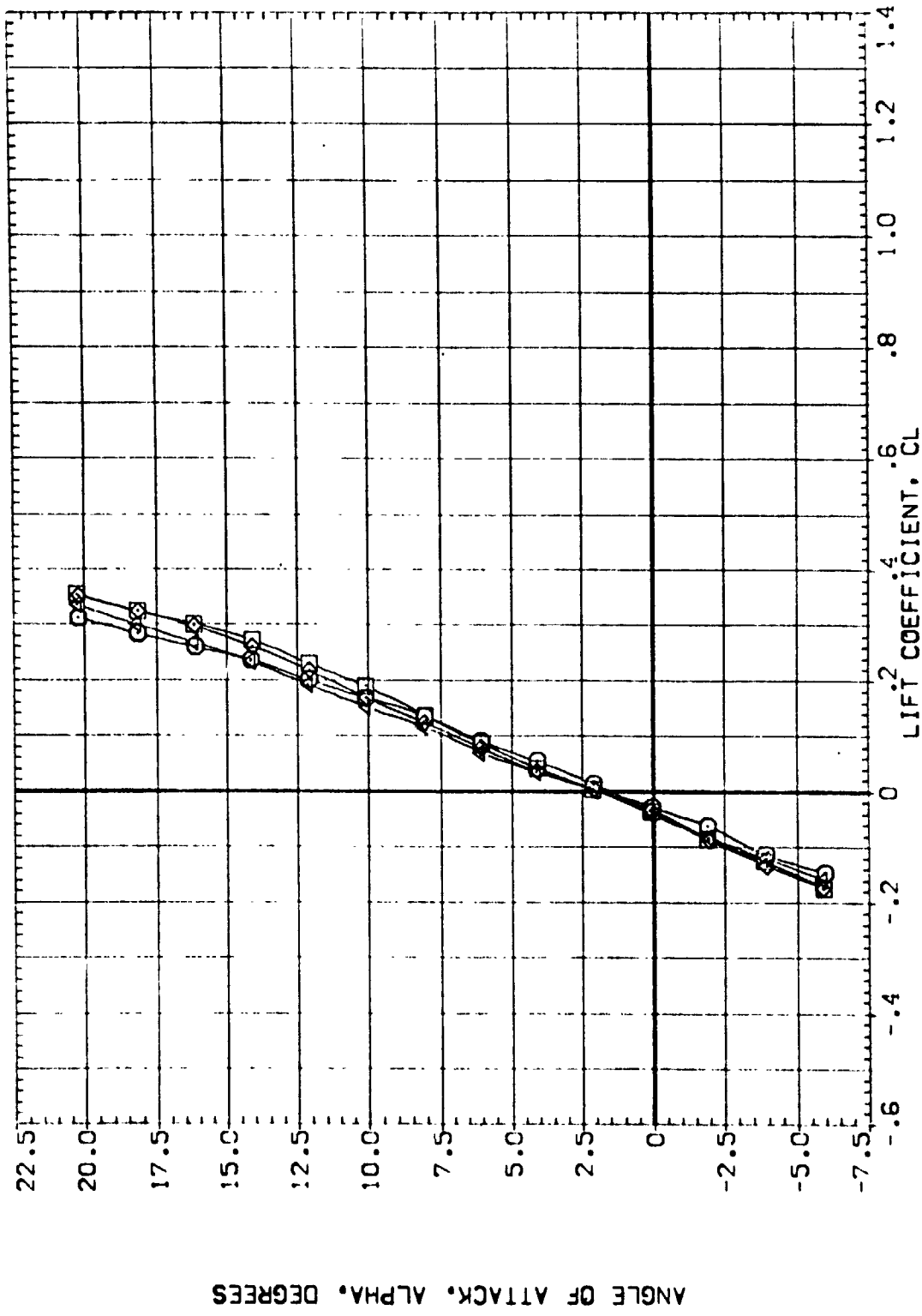


FIGURE 5. AERODYNAMIC CHARACTERISTICS IN PITCH WITH WING OFF.

(ZFJ007)

32

PARAMETRIC VALUES

.000

DELTA

WIND

.001

.001

.001

.001

SYMBOL

○

△

◇

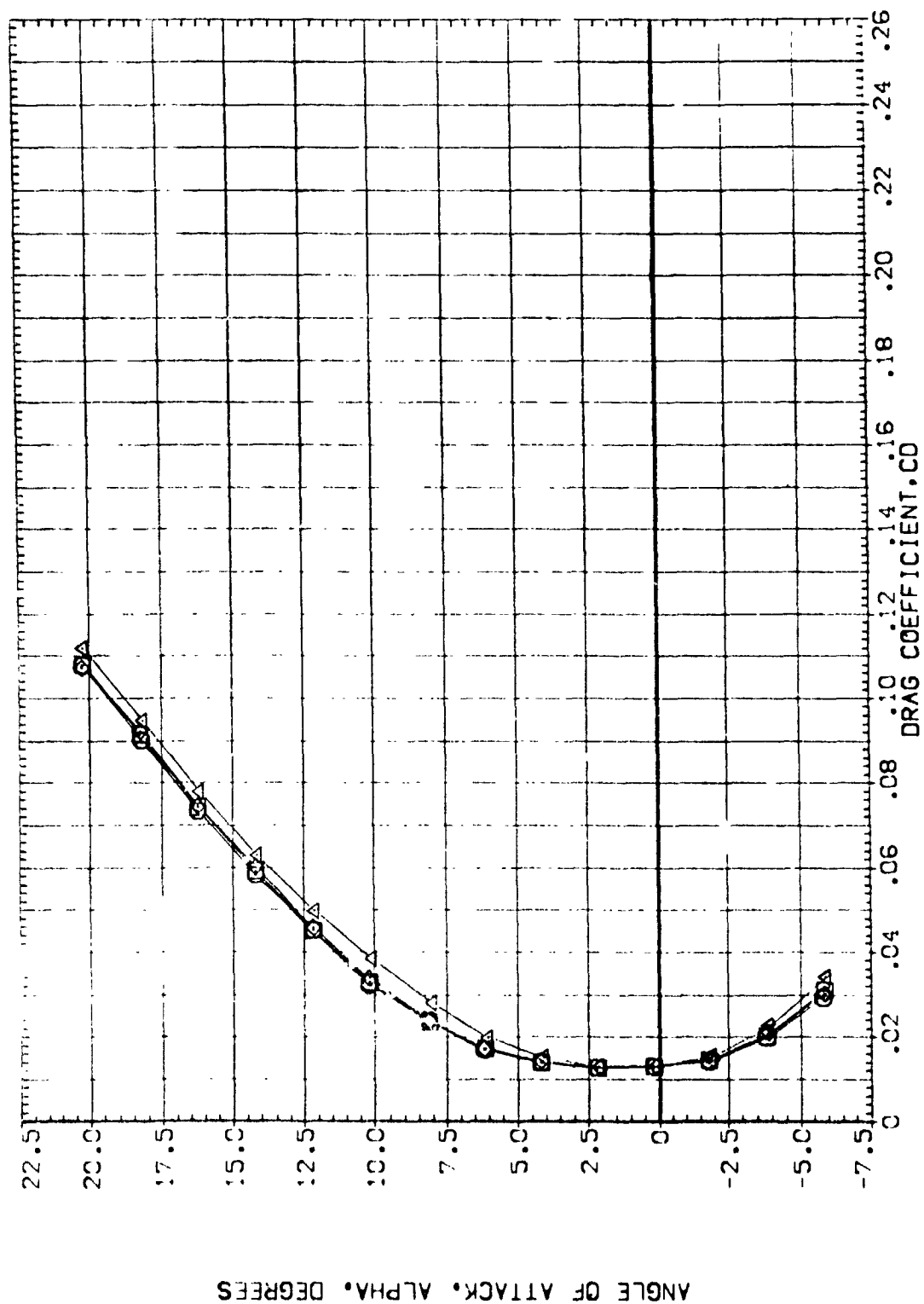


FIGURE 5. AERODYNAMIC CHARACTERISTICS IN PITCH WITH WING OFF.

(ZFJ007)

B2 T

SYMBOL	MACH	BETA	PARAMETRIC VALUES .000
○	.982		
◇	1.052		
△	1.101		
	1.201		

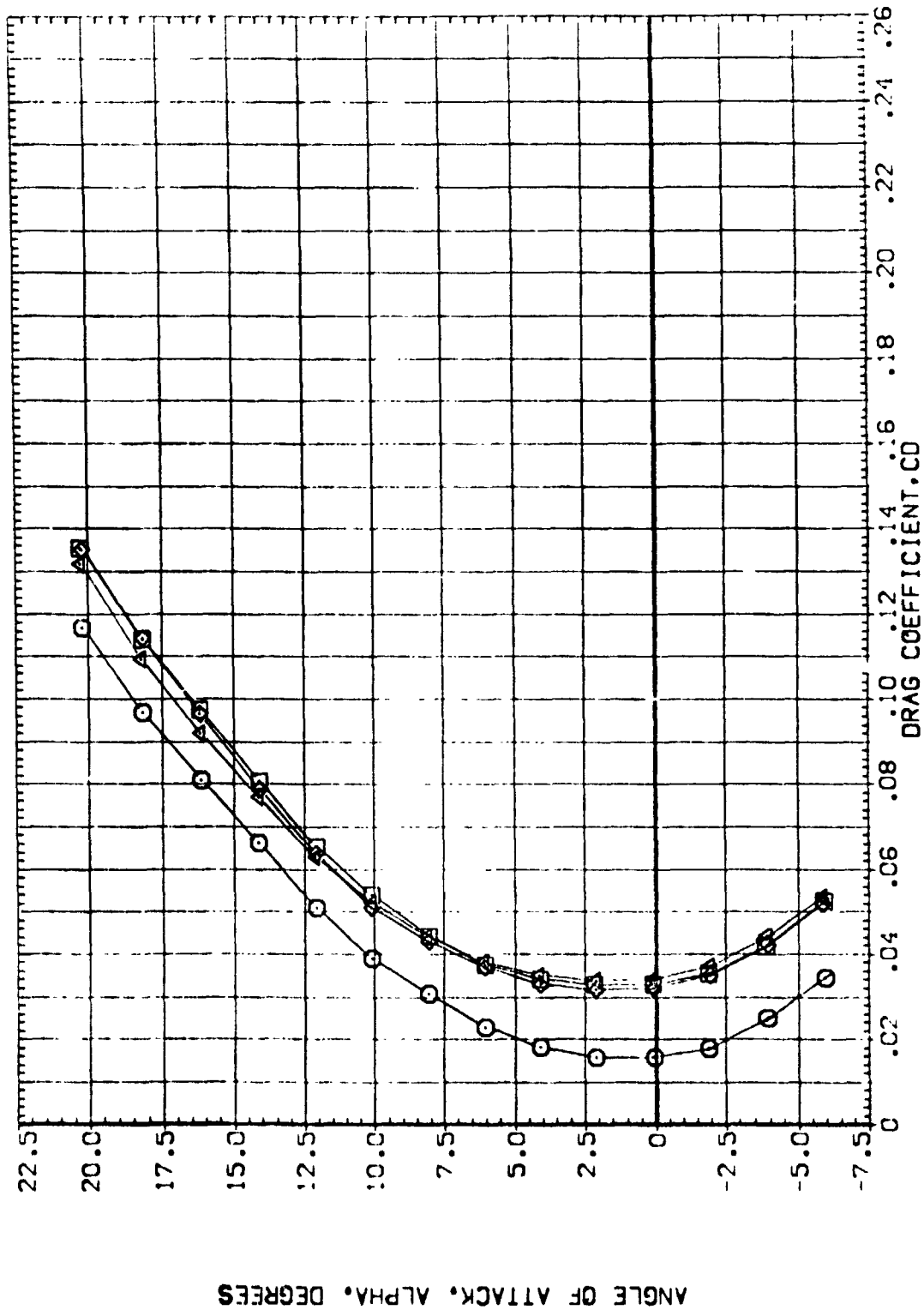


FIGURE 5. AERODYNAMIC CHARACTERISTICS IN PITCH WITH WING OFF.





SYMBOL MACH BETA .000  
 O .982  
 > 1.052  
 < 1.101  
 < 1.201

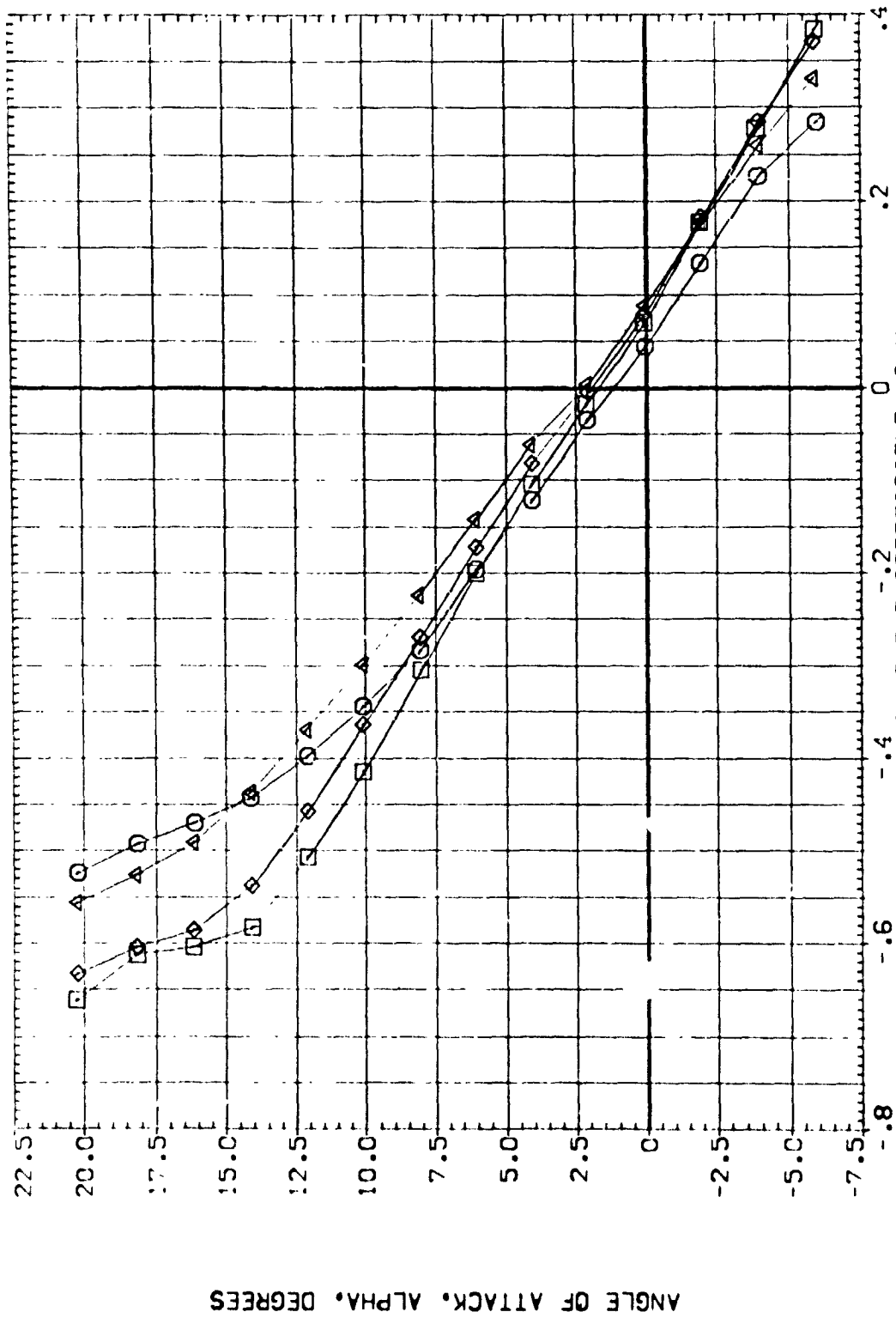


FIGURE 5. AERODYNAMIC CHARACTERISTICS IN PITCH WITH WING OFF.

(ZFJ007)

37

SYMBOL:  $\alpha$   $\beta$   $\gamma$   $\delta$   $\epsilon$   $\zeta$   $\eta$   $\theta$   $\iota$   $\kappa$   $\lambda$   $\mu$   $\nu$   $\xi$   $\omicron$   $\pi$   $\rho$   $\sigma$   $\tau$   $\upsilon$   $\phi$   $\chi$   $\psi$   $\omega$   $\alpha$   $\beta$   $\gamma$   $\delta$   $\epsilon$   $\zeta$   $\eta$   $\theta$   $\iota$   $\kappa$   $\lambda$   $\mu$   $\nu$   $\xi$   $\omicron$   $\pi$   $\rho$   $\sigma$   $\tau$   $\upsilon$   $\phi$   $\chi$   $\psi$   $\omega$

PARAMETRIC VALUES

$\alpha$   $\beta$   $\gamma$   $\delta$   $\epsilon$   $\zeta$   $\eta$   $\theta$   $\iota$   $\kappa$   $\lambda$   $\mu$   $\nu$   $\xi$   $\omicron$   $\pi$   $\rho$   $\sigma$   $\tau$   $\upsilon$   $\phi$   $\chi$   $\psi$   $\omega$

$\alpha$   $\beta$   $\gamma$   $\delta$   $\epsilon$   $\zeta$   $\eta$   $\theta$   $\iota$   $\kappa$   $\lambda$   $\mu$   $\nu$   $\xi$   $\omicron$   $\pi$   $\rho$   $\sigma$   $\tau$   $\upsilon$   $\phi$   $\chi$   $\psi$   $\omega$

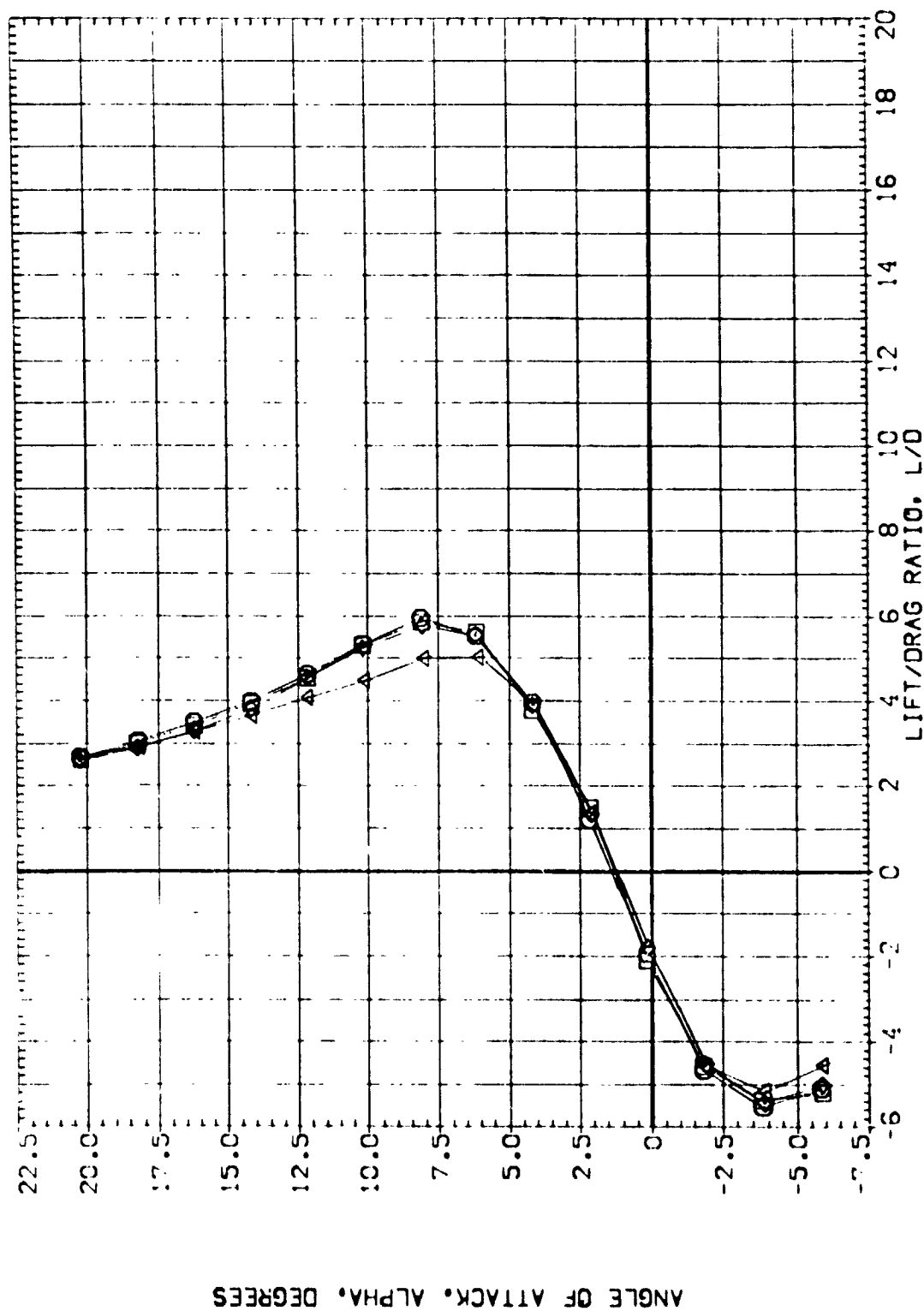


FIGURE 5. AERODYNAMIC CHARACTERISTICS IN PITCH WITH WING OFF.

SYMBOL     $\mu$  C-    BETA    PARAMETRIC VALUES  
 O    .982    .000  
 □    1.052  
 △    1.101  
 ◇    1.201

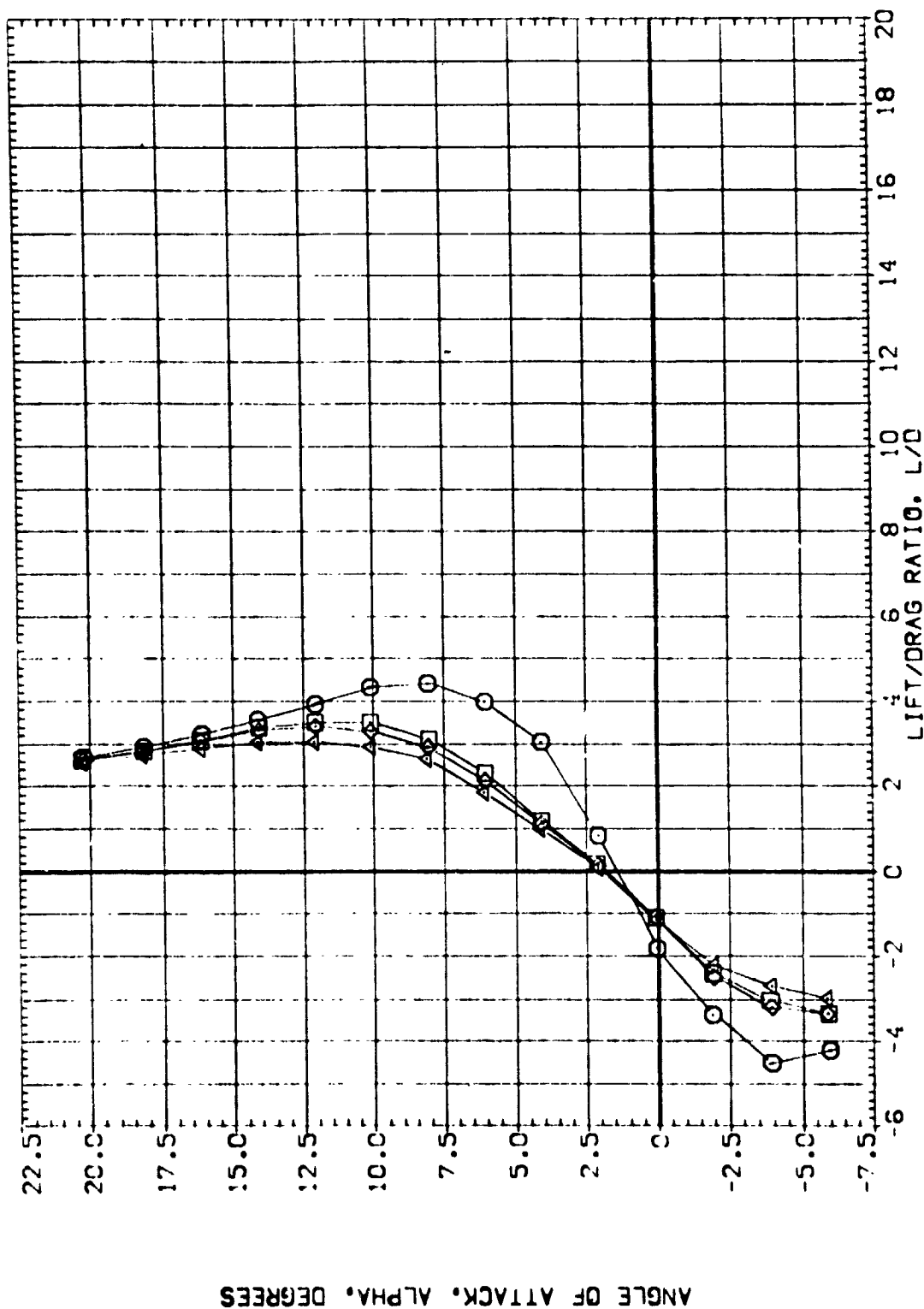


FIGURE 5. AERODYNAMIC CHARACTERISTICS IN PITCH WITH WING OFF.

(ZFJ007)

32

SYMBOL      MACH       $\delta^\circ$       PARAMETRIC VALUES  
○      .601      5      .000  
◇      .701      10      .000  
△      .801      15      .000  
▽      .95      20      .000

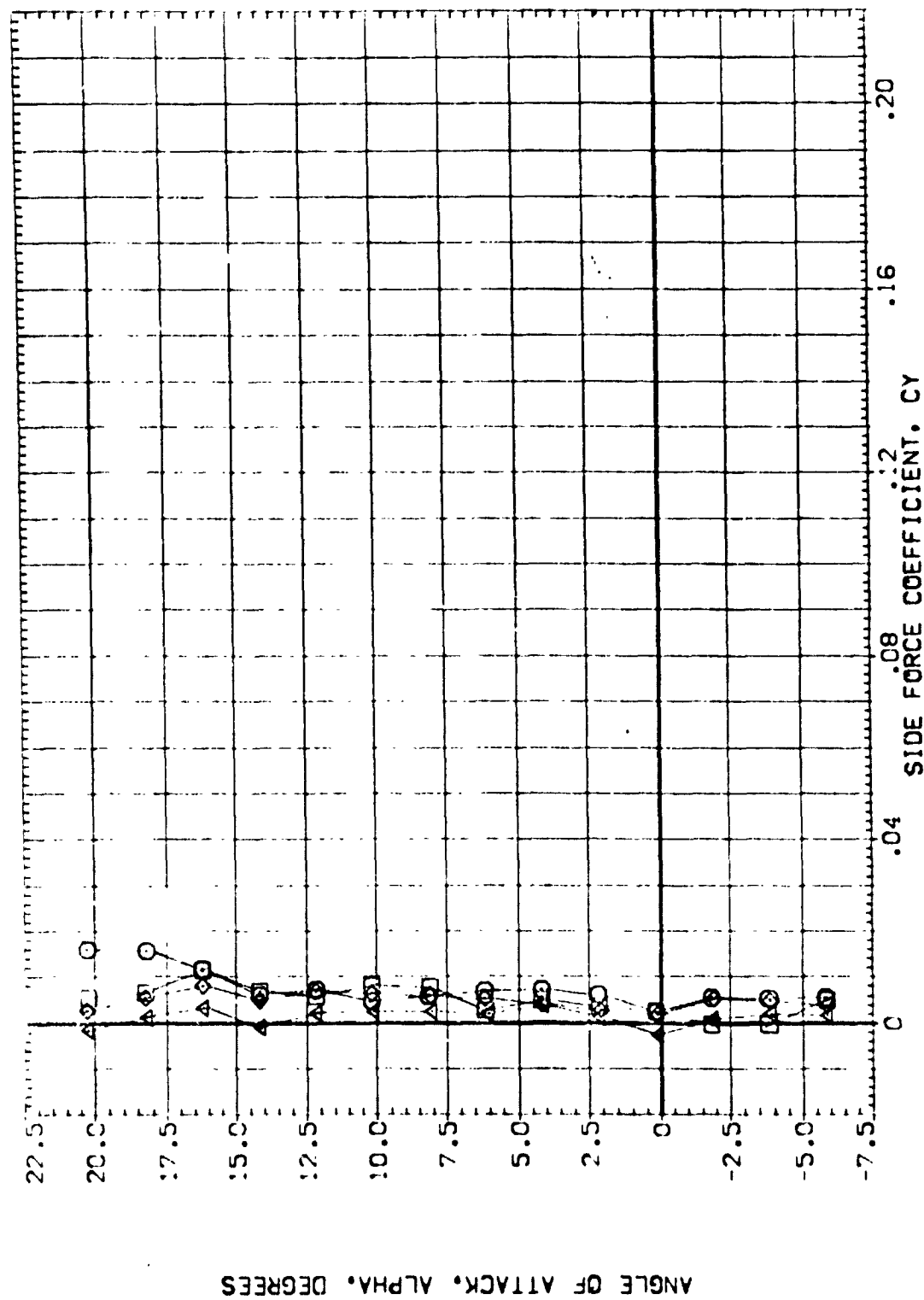


FIGURE 5. AERODYNAMIC CHARACTERISTICS IN PITCH WITH WING OFF.

(ZFJ007)

32

SYMBOL    MAG.    BETA    PARAMETRIC VALUES  
                 .000  
○    1.982  
◇    1.052  
△    1.101  
△    1.201

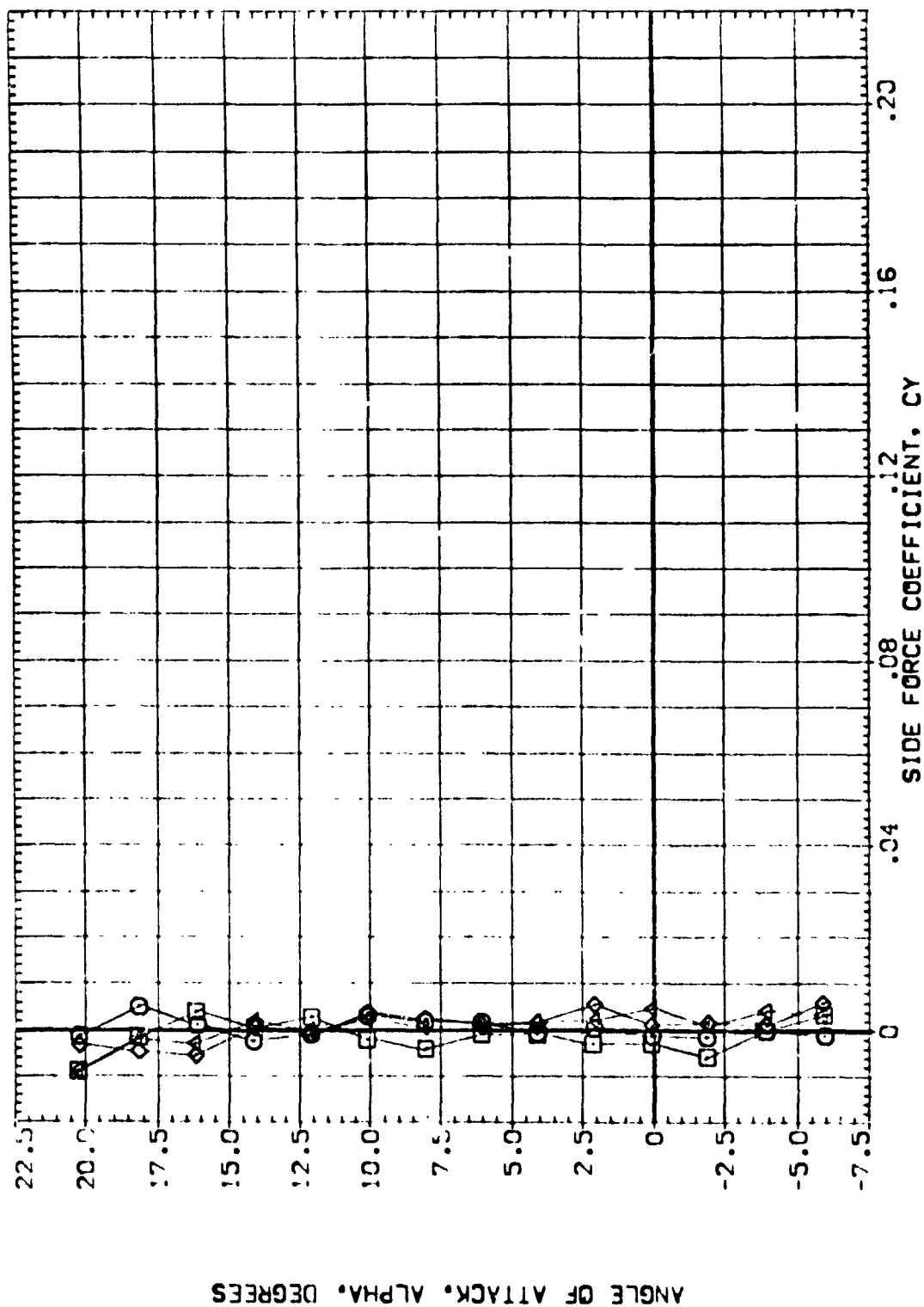


FIGURE 5. AERODYNAMIC CHARACTERISTICS IN PITCH WITH WING OFF.

(ZFJ007)

82 T  
PARAMETRIC VALUES  
WACH BETA  
0.601  
0.701  
0.801  
0.951

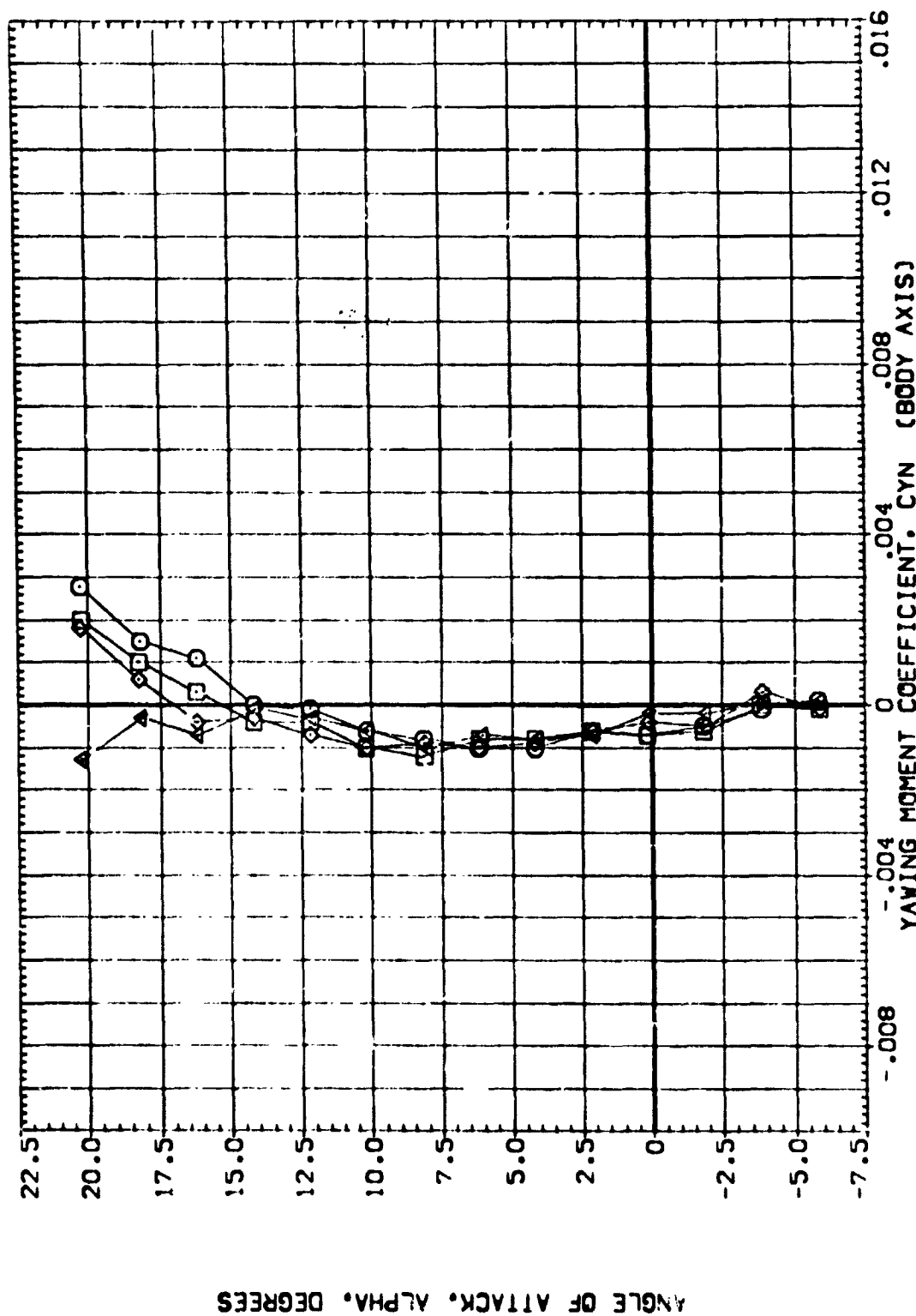


FIGURE 5. AERODYNAMIC CHARACTERISTICS IN PITCH WITH WING OFF.

(ZFJ007)

32

SYMBOL MACH BETA PARAMETRIC VALUES  
◇ 1.002  
□ 1.052  
△ 1.101  
▽ 1.201

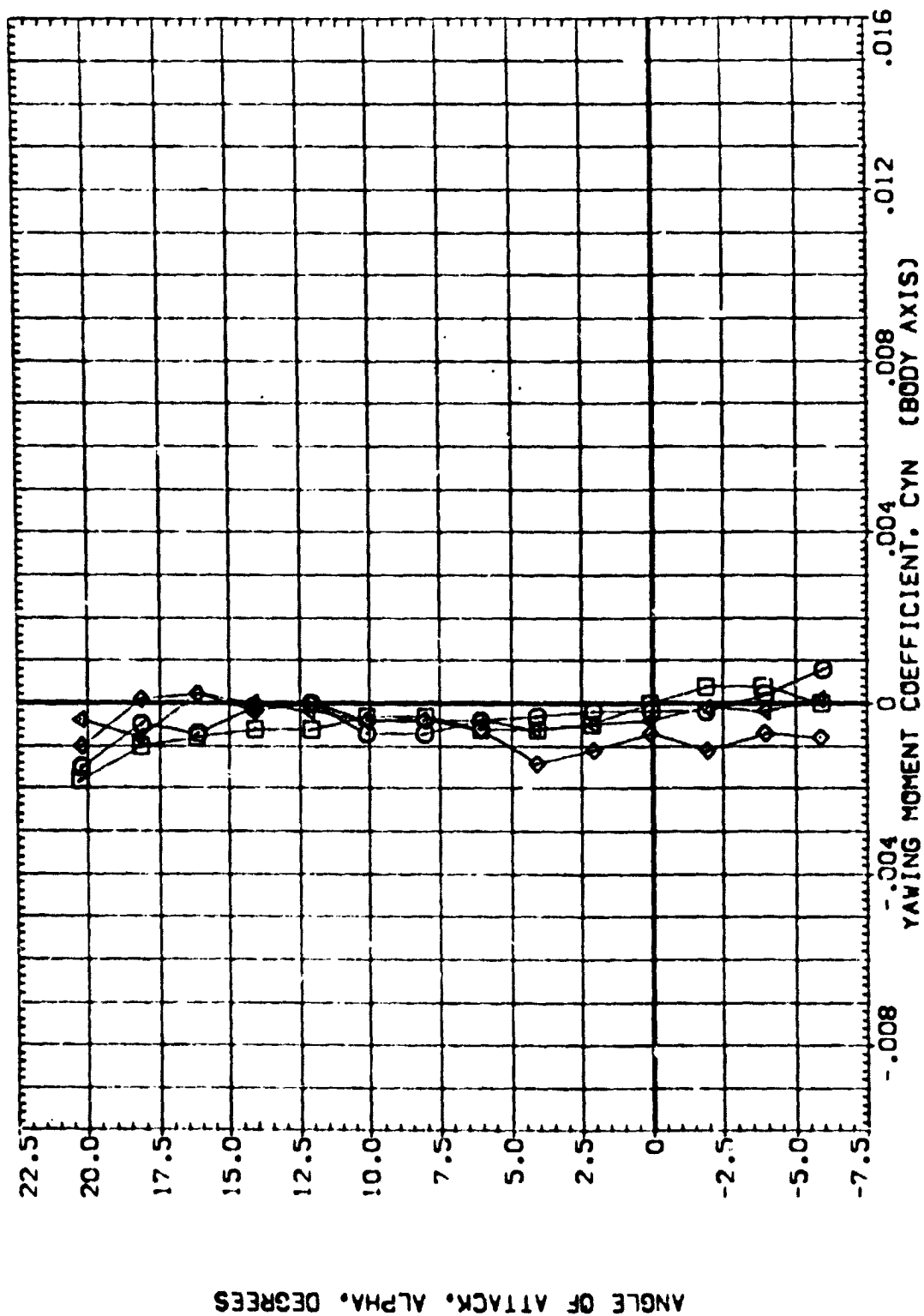


FIGURE 5. AERODYNAMIC CHARACTERISTICS IN PITCH WITH WING OFF.



(ZFJU07)

PARAMETRIC VALUES

RE

SYMBOL  
0.004  
0.001  
0.001  
0.001  
0.001

ANGLE OF ATTACK, ALPHA, DEGREES

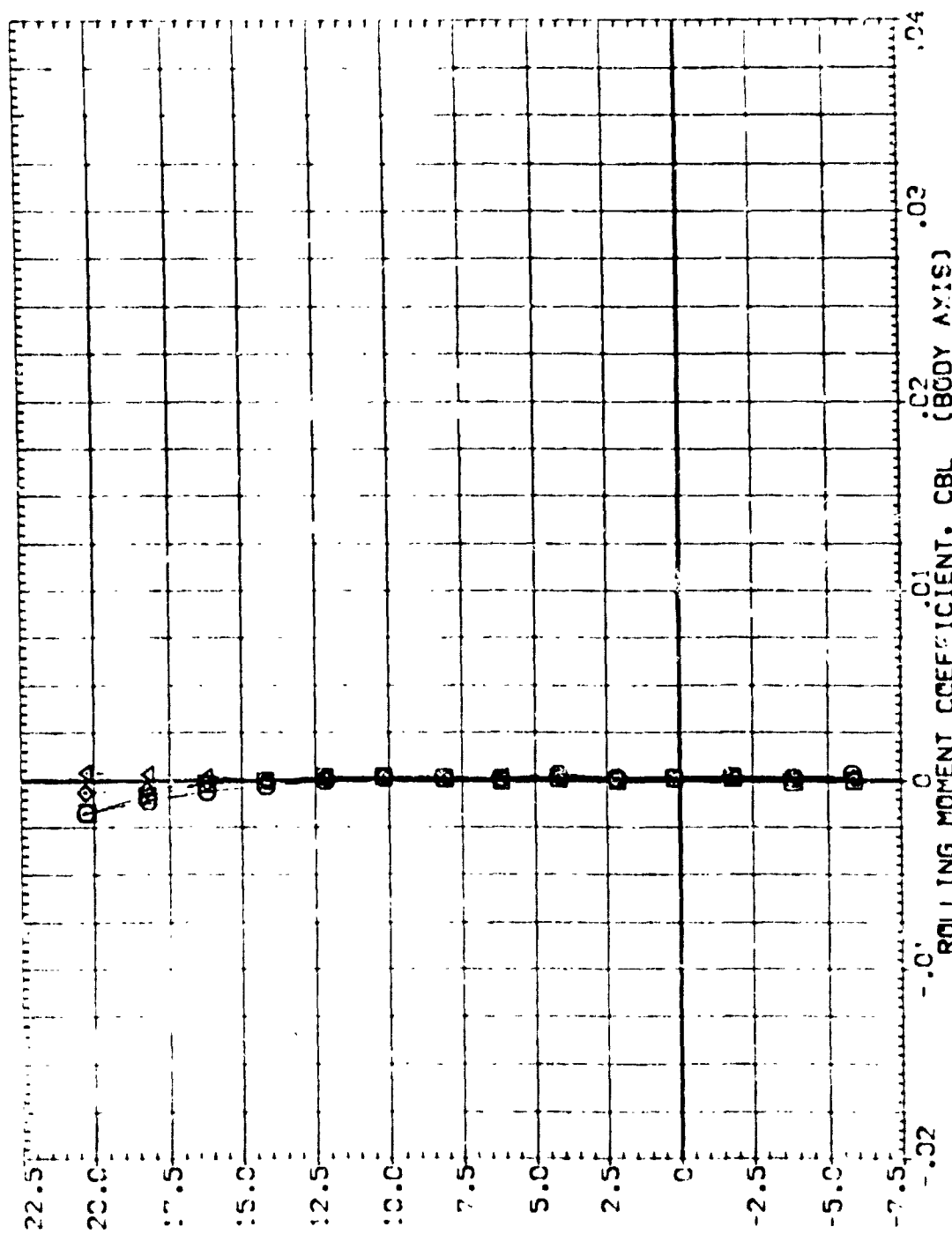


FIGURE J. AERODYNAMIC CHARACTERISTICS IN PITCH WITH WING OFF.

(ZFJ007)

B2 T

SYMBOL MACH BETA PARAMETRIC VALUES  
◇ □ ○ △ .982  
1.052  
1.101  
1.201

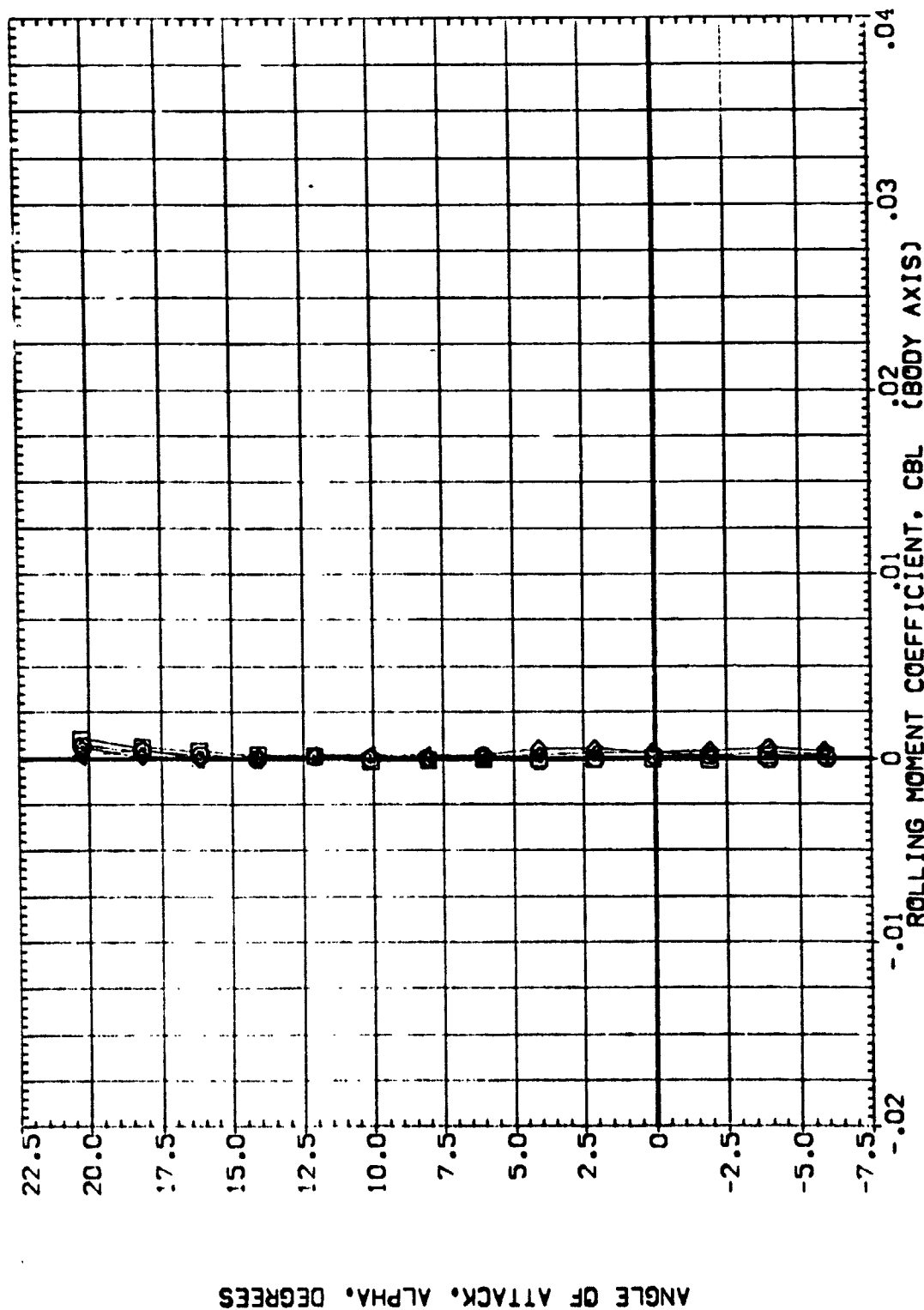


FIGURE 5. AERODYNAMIC CHARACTERISTICS IN PITCH WITH WING OFF.

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RE:008] +5.82  
 [RE:009] DATA NOT AVAILABLE  
 [RE:010] DATA NOT AVAILABLE  
 [RE:011] DATA NOT AVAILABLE  
 [RE:012] DATA NOT AVAILABLE

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

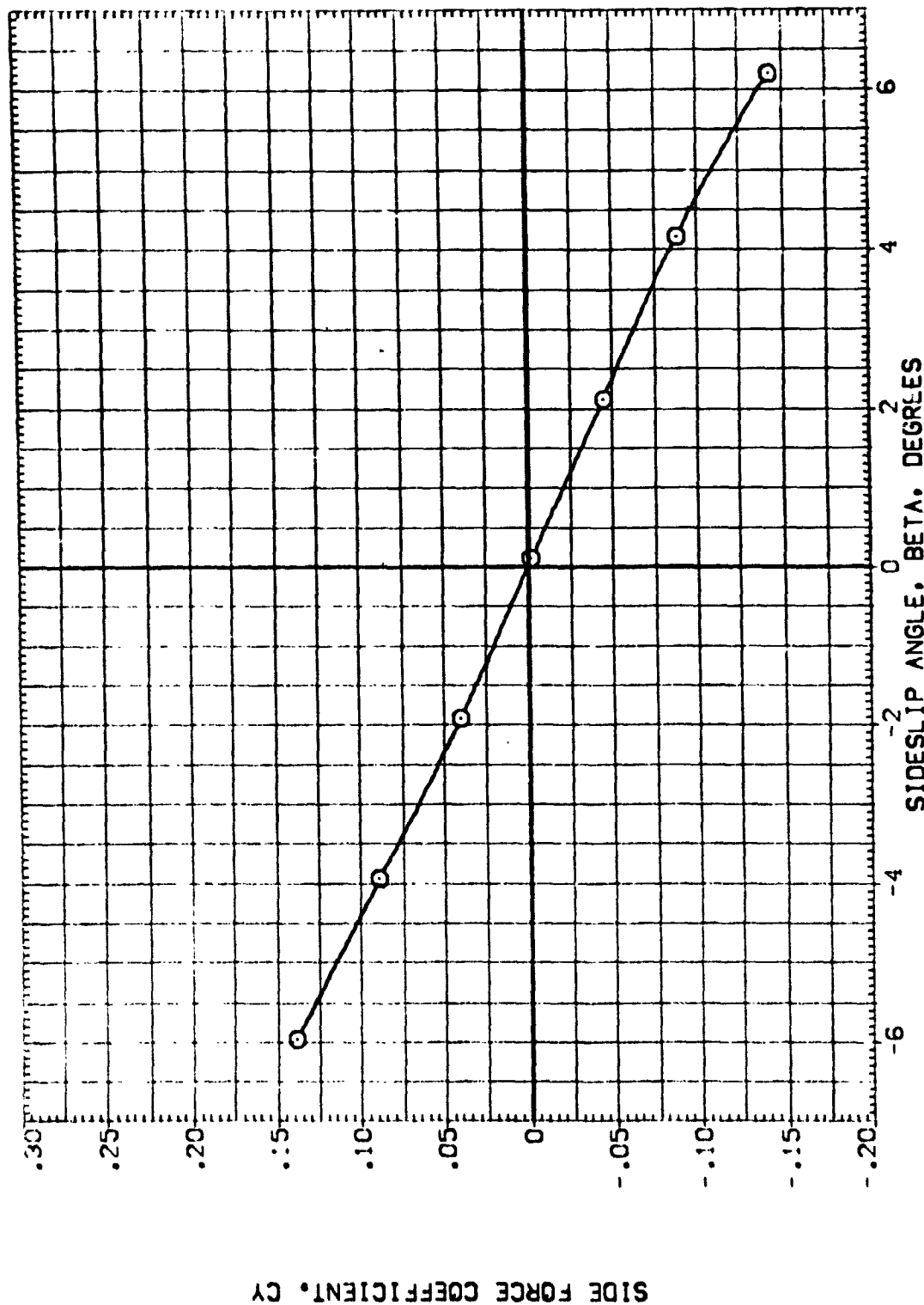


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(A)  $M_\infty = .60$

DATA SET SYMBOL VS BZ T CONFIGURATION DESCRIPTION  
 (#J008) Q X Z DATA NOT AVAILABLE  
 (#J009) DATA NOT AVAILABLE  
 (#J010) DATA NOT AVAILABLE  
 (#J011) DATA NOT AVAILABLE  
 (#J012) DATA NOT AVAILABLE

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

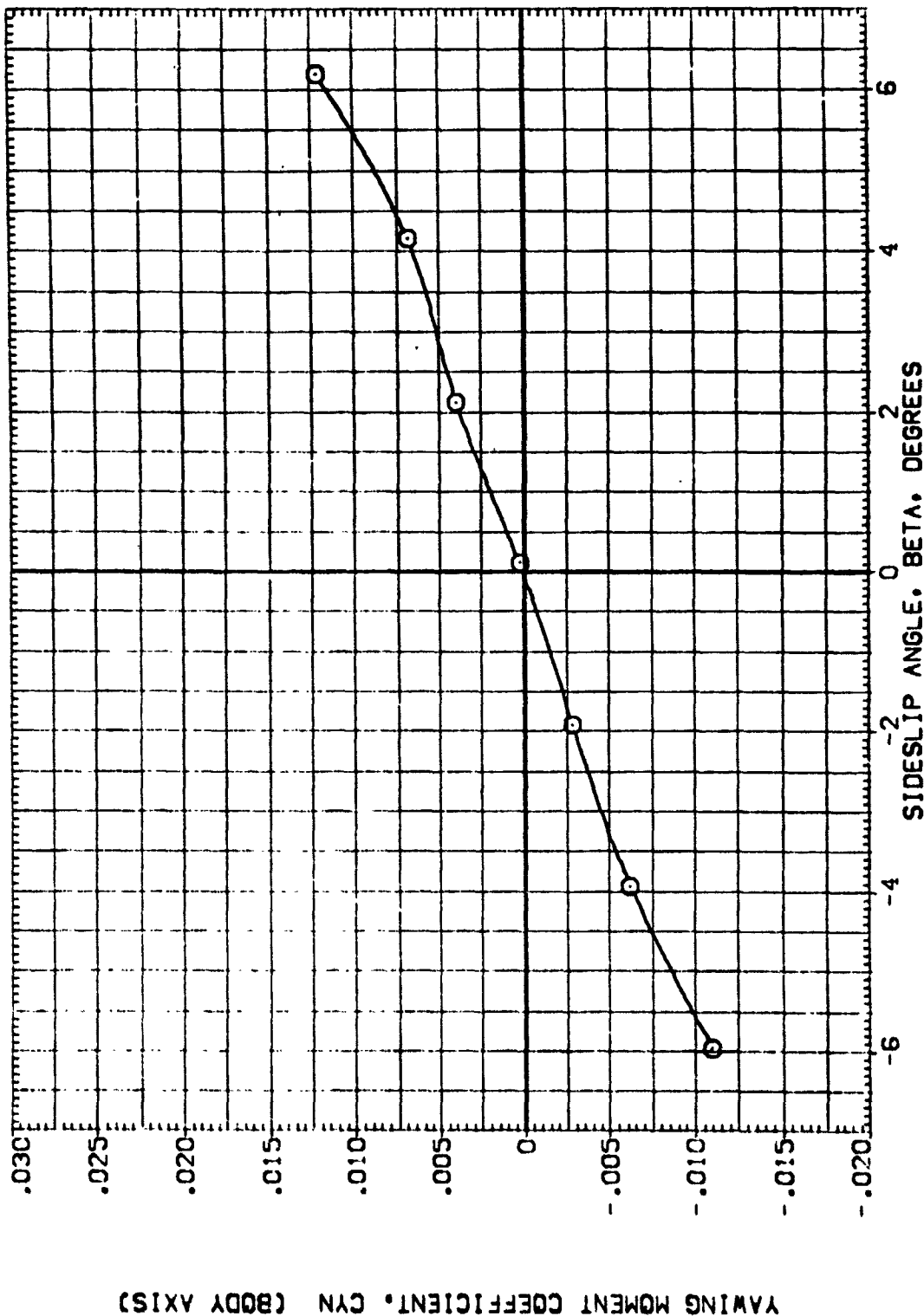


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(A)MACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RE:008] 0 VS 32 DATA NOT AVAILABLE  
 [RE:009] 1 DATA NOT AVAILABLE  
 [RE:010] 2 DATA NOT AVAILABLE  
 [RE:011] 3 DATA NOT AVAILABLE  
 [RE:012] 4 DATA NOT AVAILABLE

LAMBDA ALPHA  
 .000 5.000  
 45.000 3.000  
 45.000 3.000  
 60.000 3.000

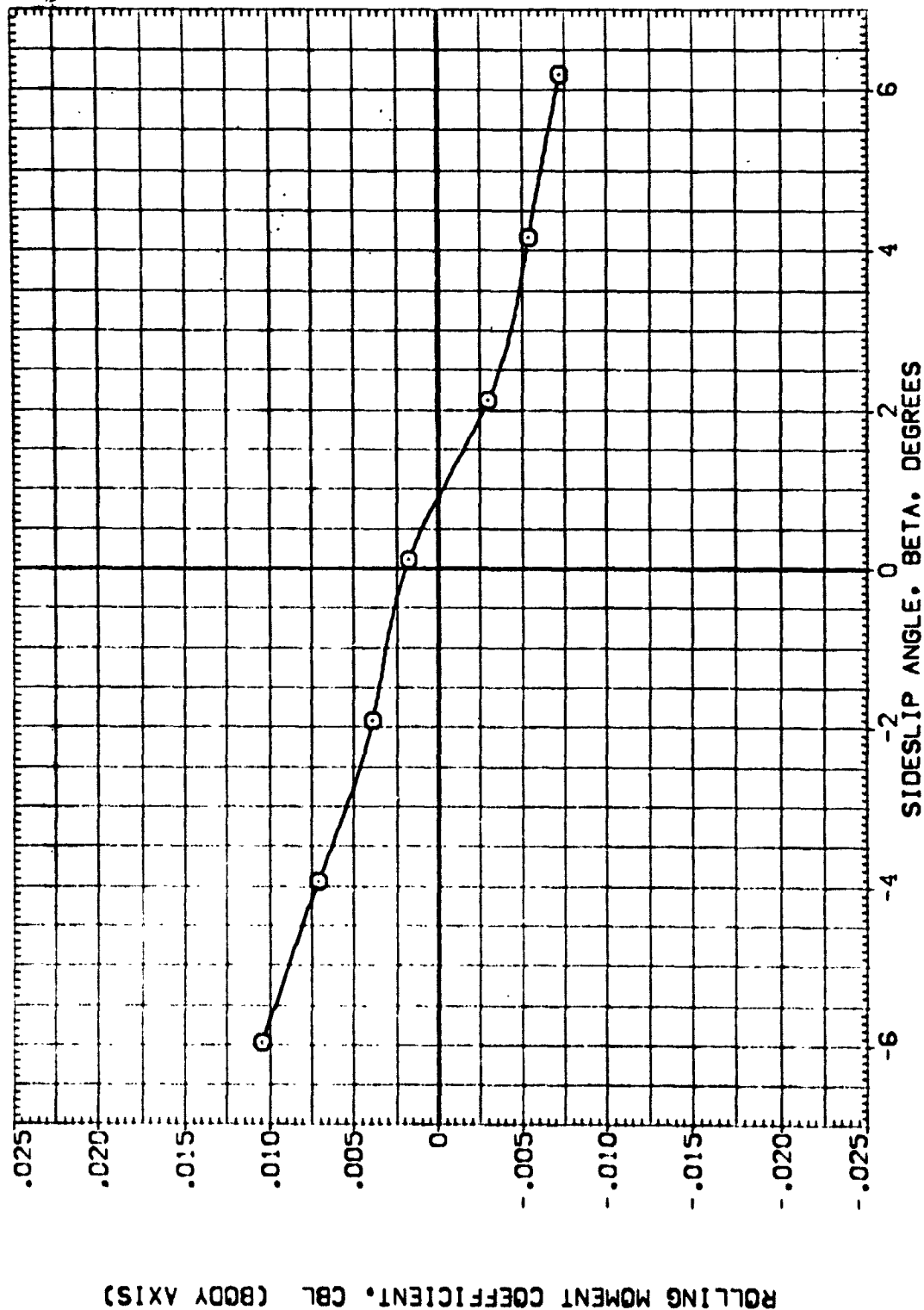


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(A)  $\gamma_{AC} = .60$

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 Q VS BZ T  
 [RE-1008] DATA NOT AVAILABLE  
 [RE-1009] DATA NOT AVAILABLE  
 [RE-1010] DATA NOT AVAILABLE  
 [RE-1011] DATA NOT AVAILABLE  
 [RE-1012] DATA NOT AVAILABLE

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 5.000  
 60.000 5.000

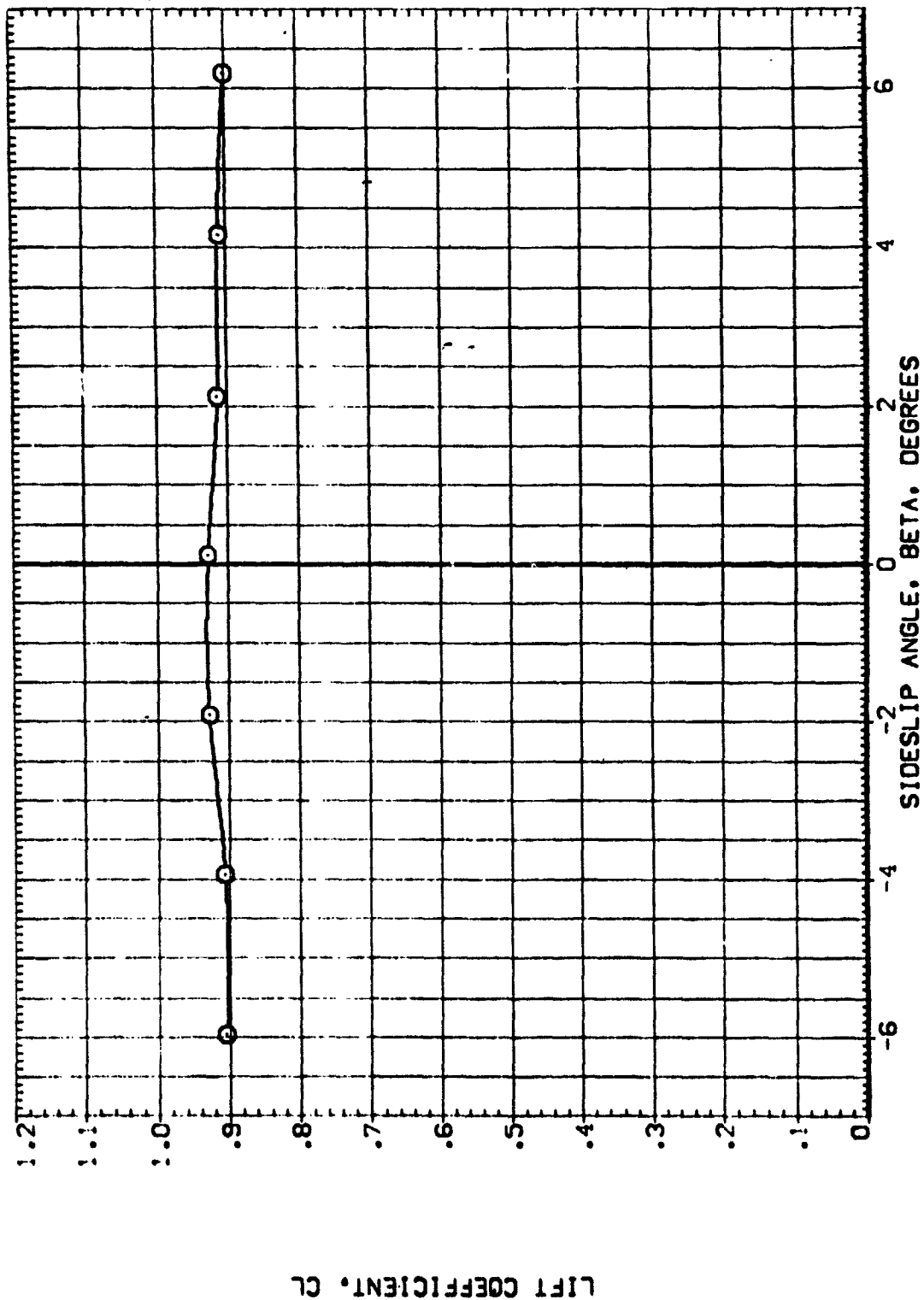


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(A)YACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 ( # 1008 ) VS BZ 1 DATA NOT AVAILABLE  
 ( # 1009 ) DATA NOT AVAILABLE  
 ( # 1010 ) DATA NOT AVAILABLE  
 ( # 1011 ) DATA NOT AVAILABLE

LAMBDA ALPHA  
 .000 5.000  
 .45.000 5.000  
 .60.000 5.000  
 .60.000 3.000

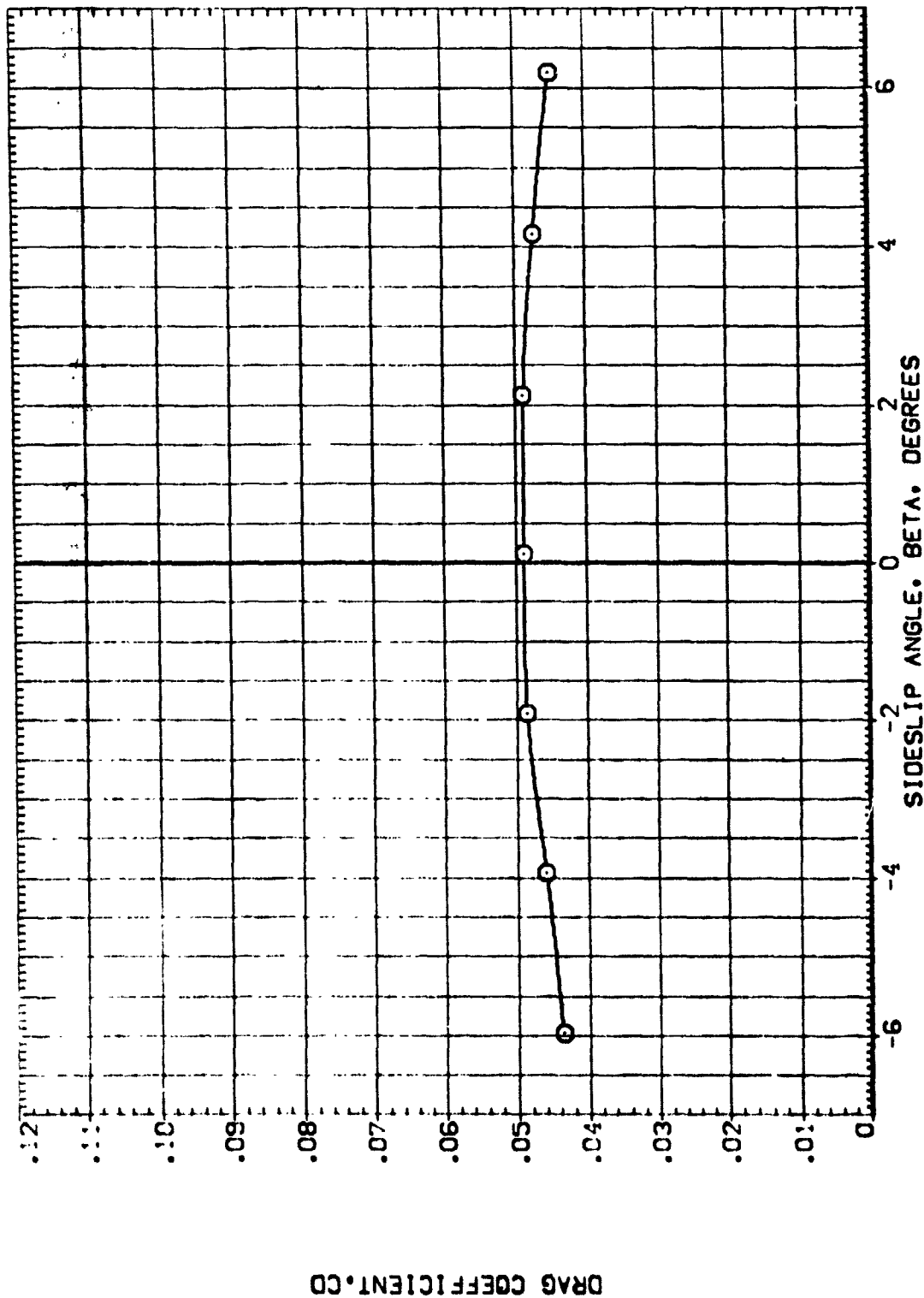


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(A) VAC = .60

DATA SET SYMB. CONFIGURATION DESCRIPTION  
 [R-0001] VS B2 T AVAILABLE  
 [R-0002] DATA NOT AVAILABLE  
 [R-0003] DATA NOT AVAILABLE  
 [R-0004] DATA NOT AVAILABLE  
 [R-0005] DATA NOT AVAILABLE

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 60.000 5.000

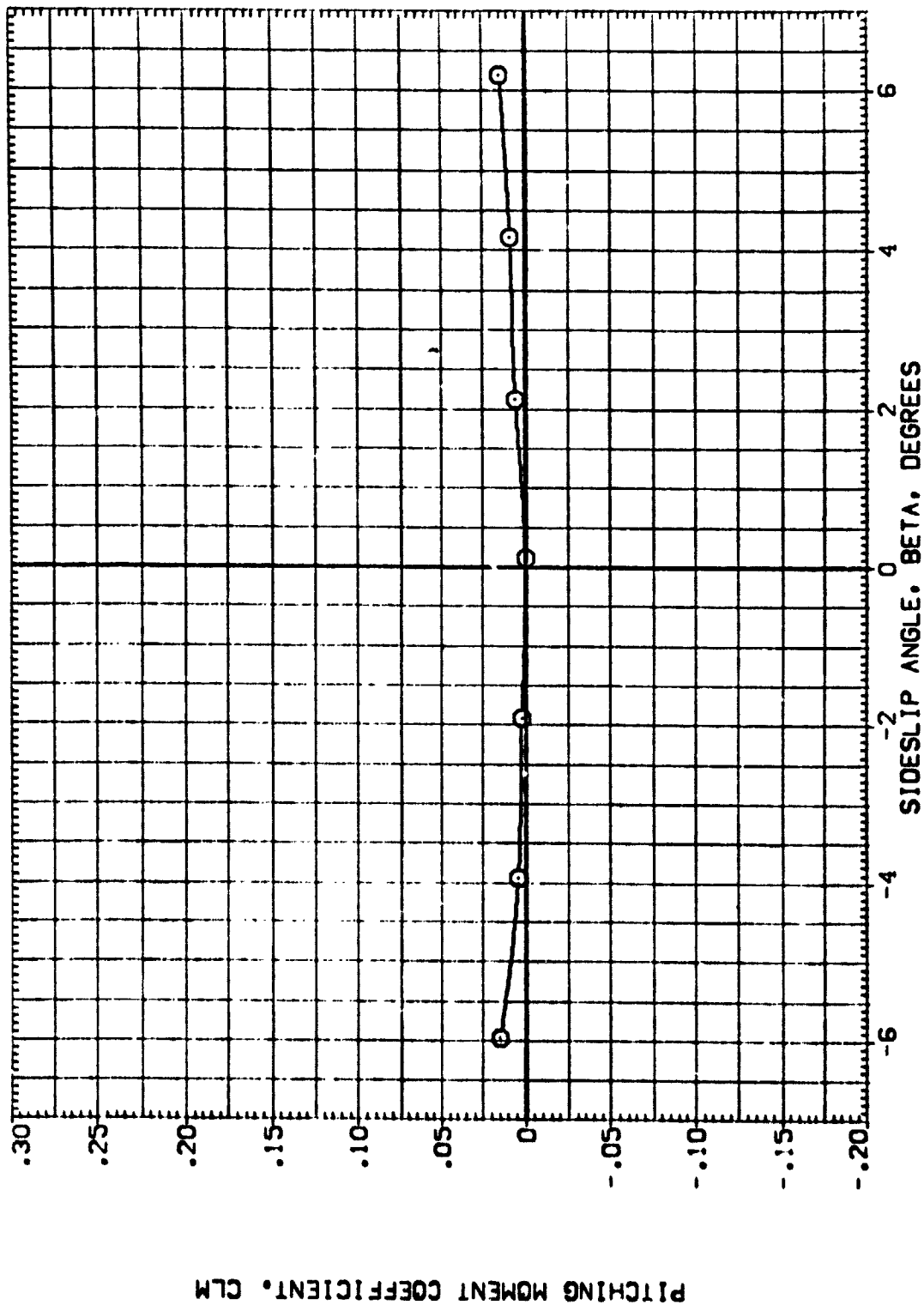


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(MACH = .60)



DATA SET SYMBOL. CO-ORDINATION DESCRIPTION  
 15.80  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE  
 DATA NOT AVAILABLE

LAMDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

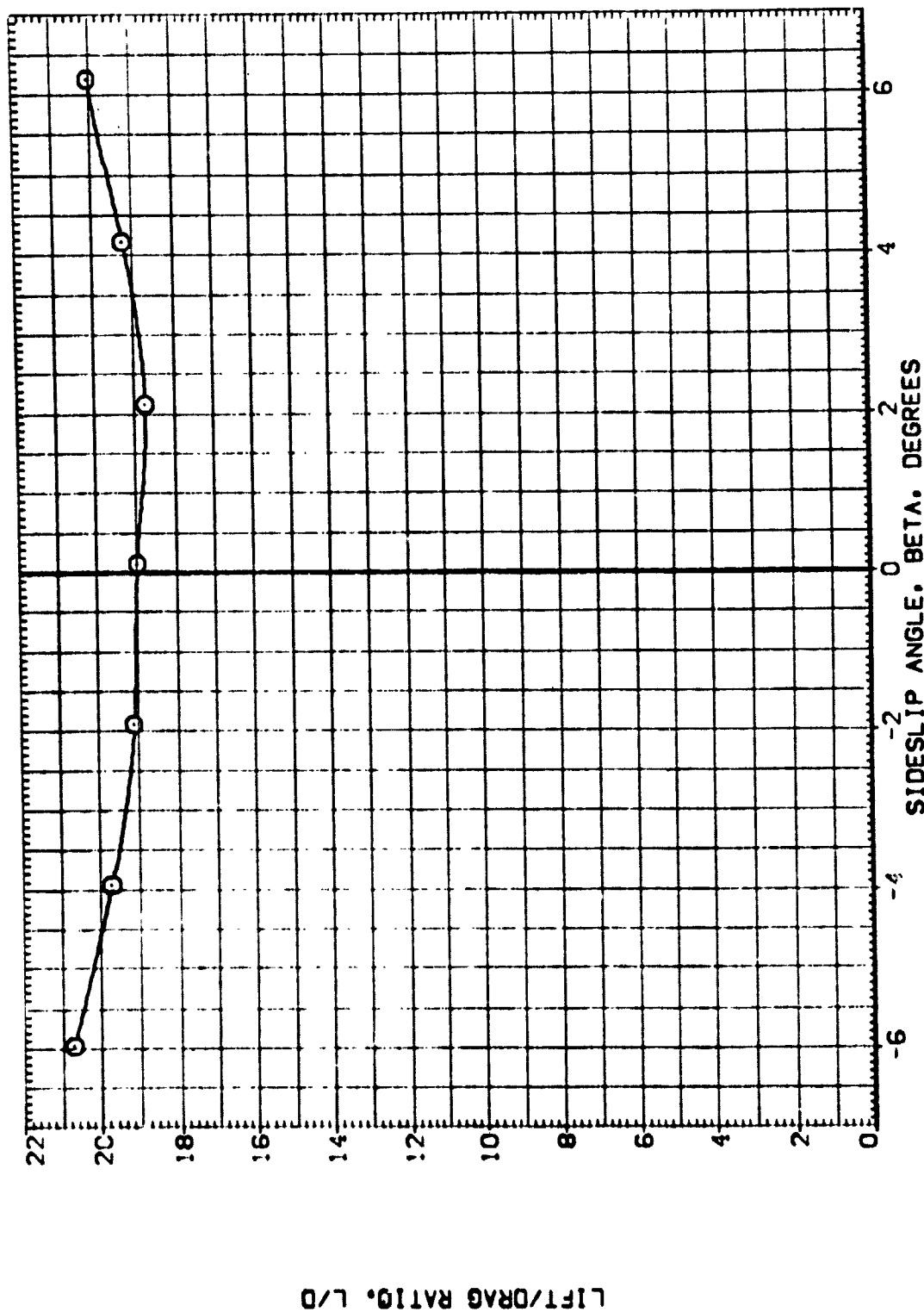


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(A)  $MACH = .60$

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [ #F1008 ] VS B2 1  
 [ #F1009 ] VS B2 2  
 [ #F1010 ] VS B2 3  
 [ #F1011 ] DATA NOT AVAILABLE  
 [ #F1012 ] DATA NOT AVAILABLE

LAMBDA ALPHA  
 .000 5.000  
 .45.000 5.000  
 .45.000 3.000  
 .60.000 5.000  
 .60.000 3.000

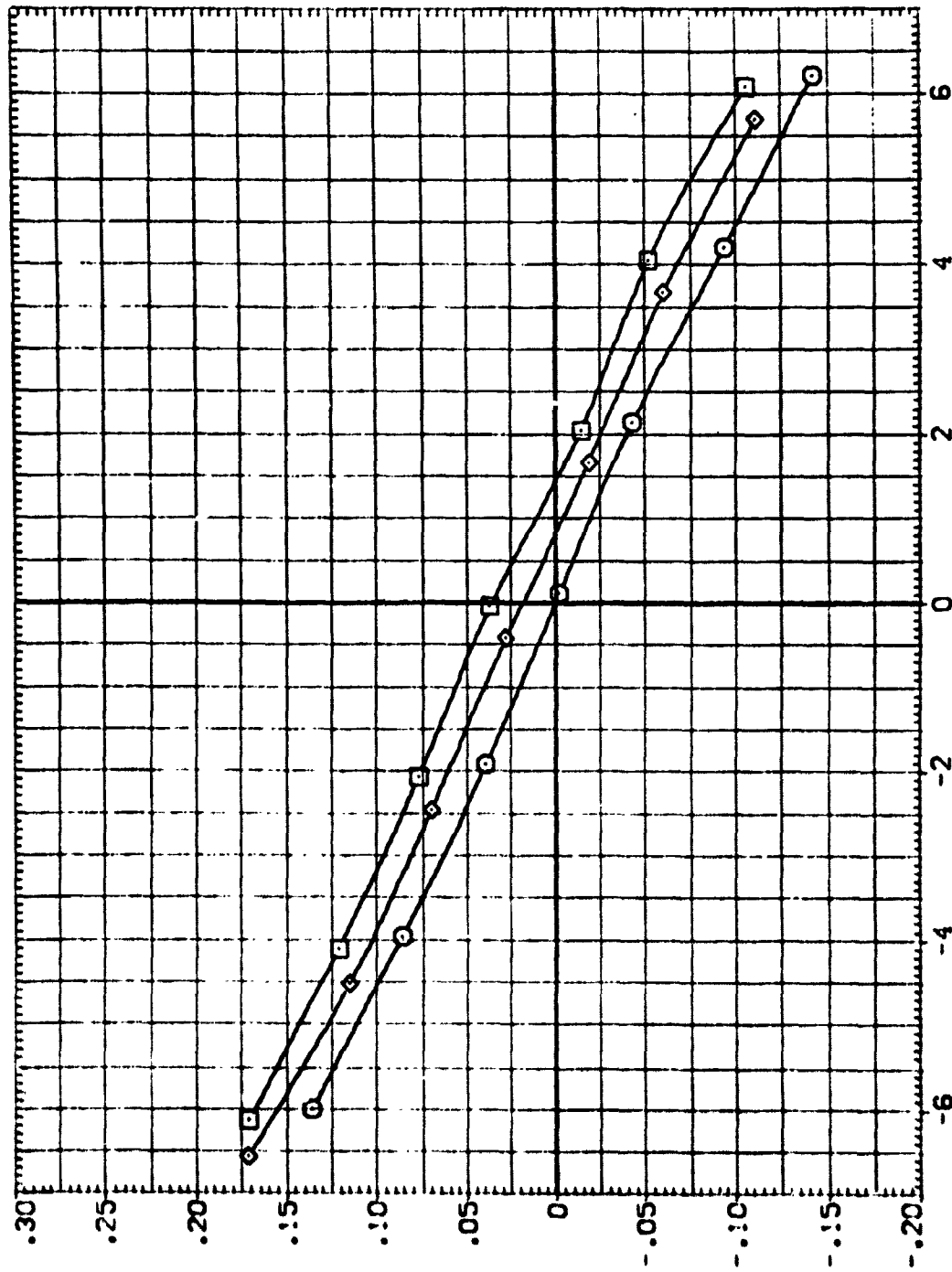


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(B)  $Mach = .70$

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (REF: 1008) VS B2  
 (REF: 1009) VS B2  
 (REF: 1010) VS B2  
 (REF: 1011) DATA NOT AVAILABLE  
 (REF: 1012) DATA NOT AVAILABLE

LAMDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

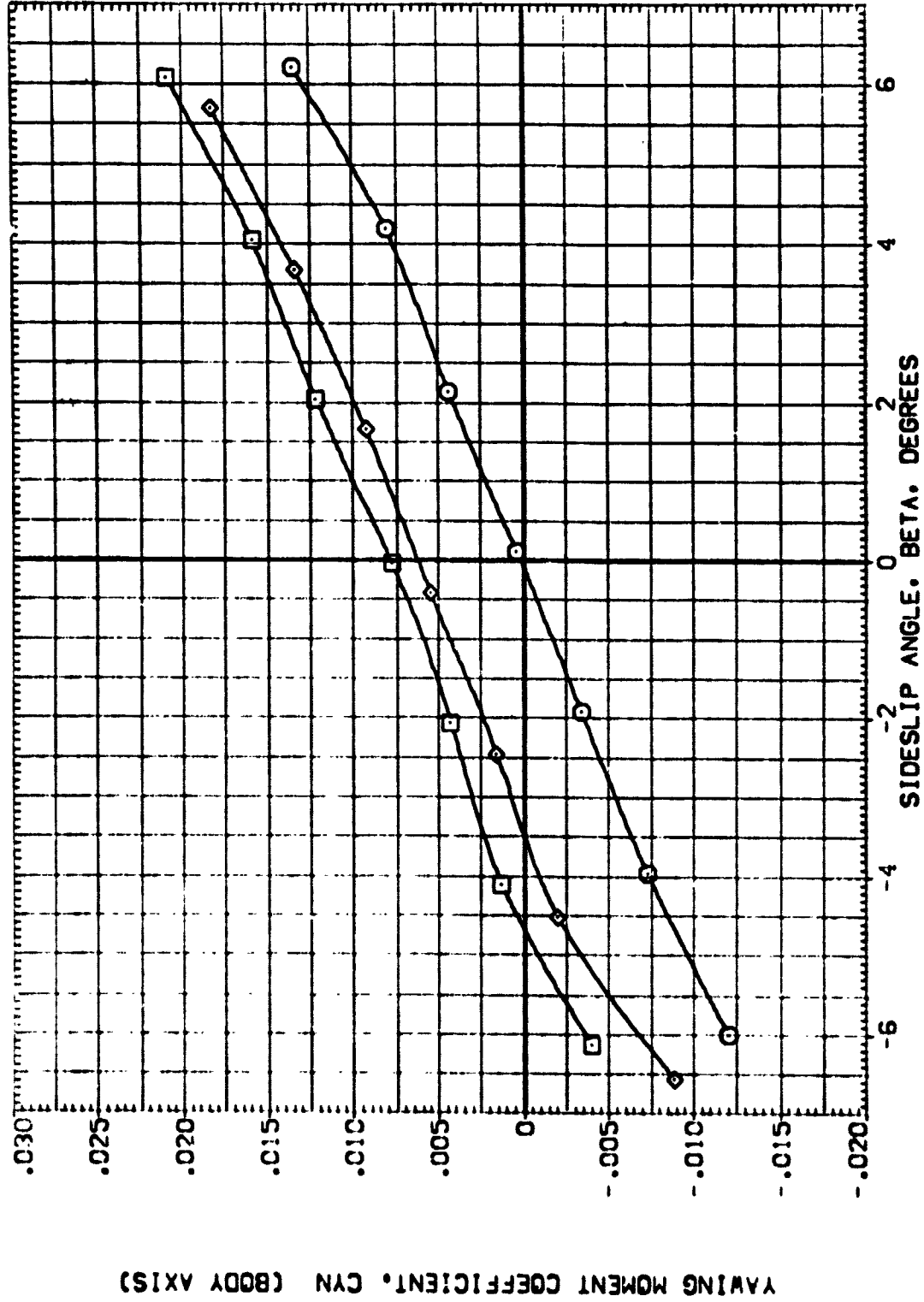


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(B)  $\gamma_{AC} = .70$

DATA SET SYMBOL. CONFIGURATION DESCRIPTION  
 [M-008] V5 B2 Y  
 [M-009] V5 B2 Y  
 [M-010] V5 B2 Y  
 [M-011] DATA NOT AVAILABLE  
 [M-012] DATA NOT AVAILABLE

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 3.000

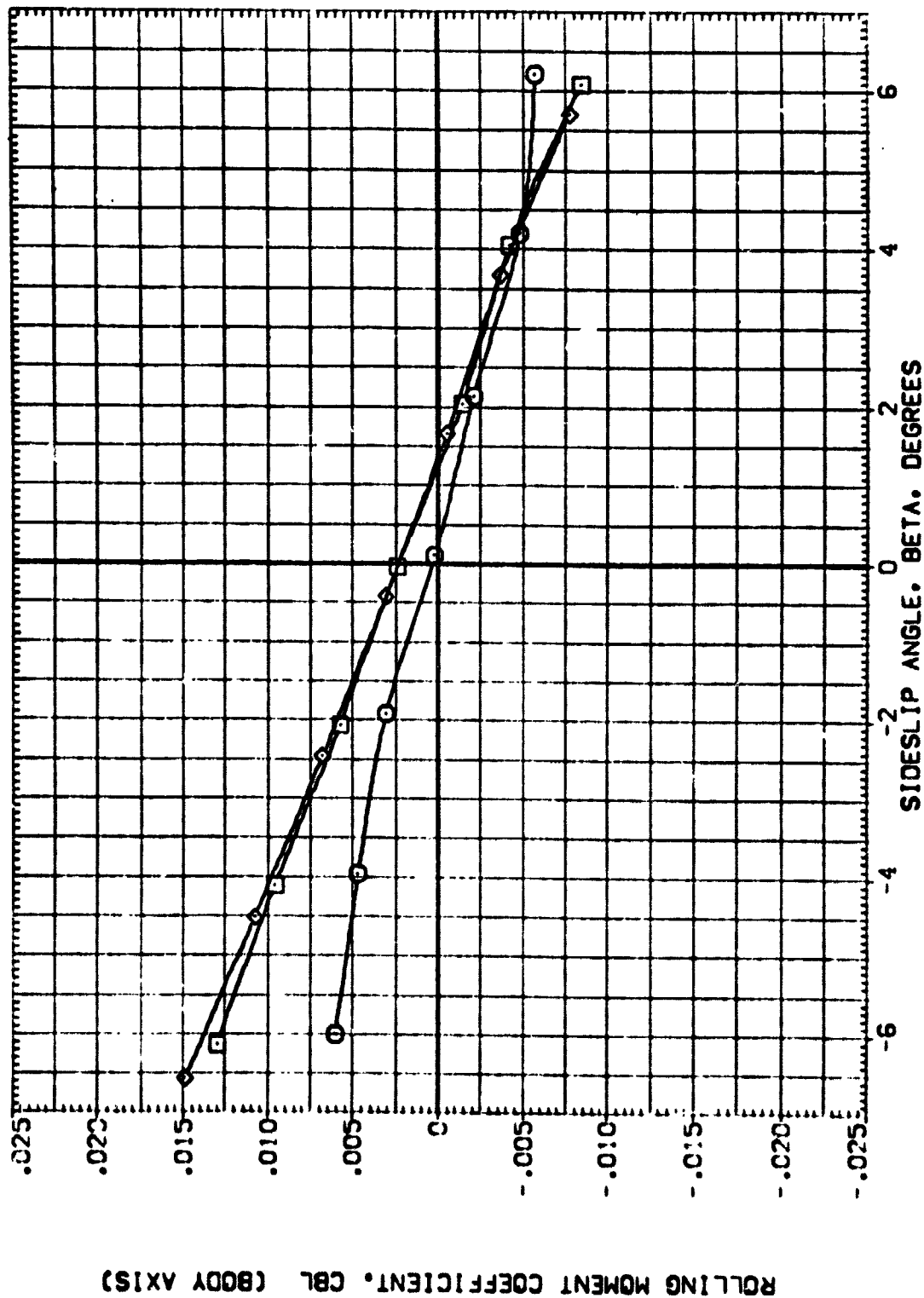


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(B)  $\gamma_{AC} = .70$

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 0 VS B2  
 1 VS B2  
 2 VS B2  
 3 DATA NOT AVAILABLE  
 4 DATA NOT AVAILABLE

LAMBDA ALPHA  
 0.000 5.000  
 45.000 5.000  
 45.000 5.000  
 80.000 5.000

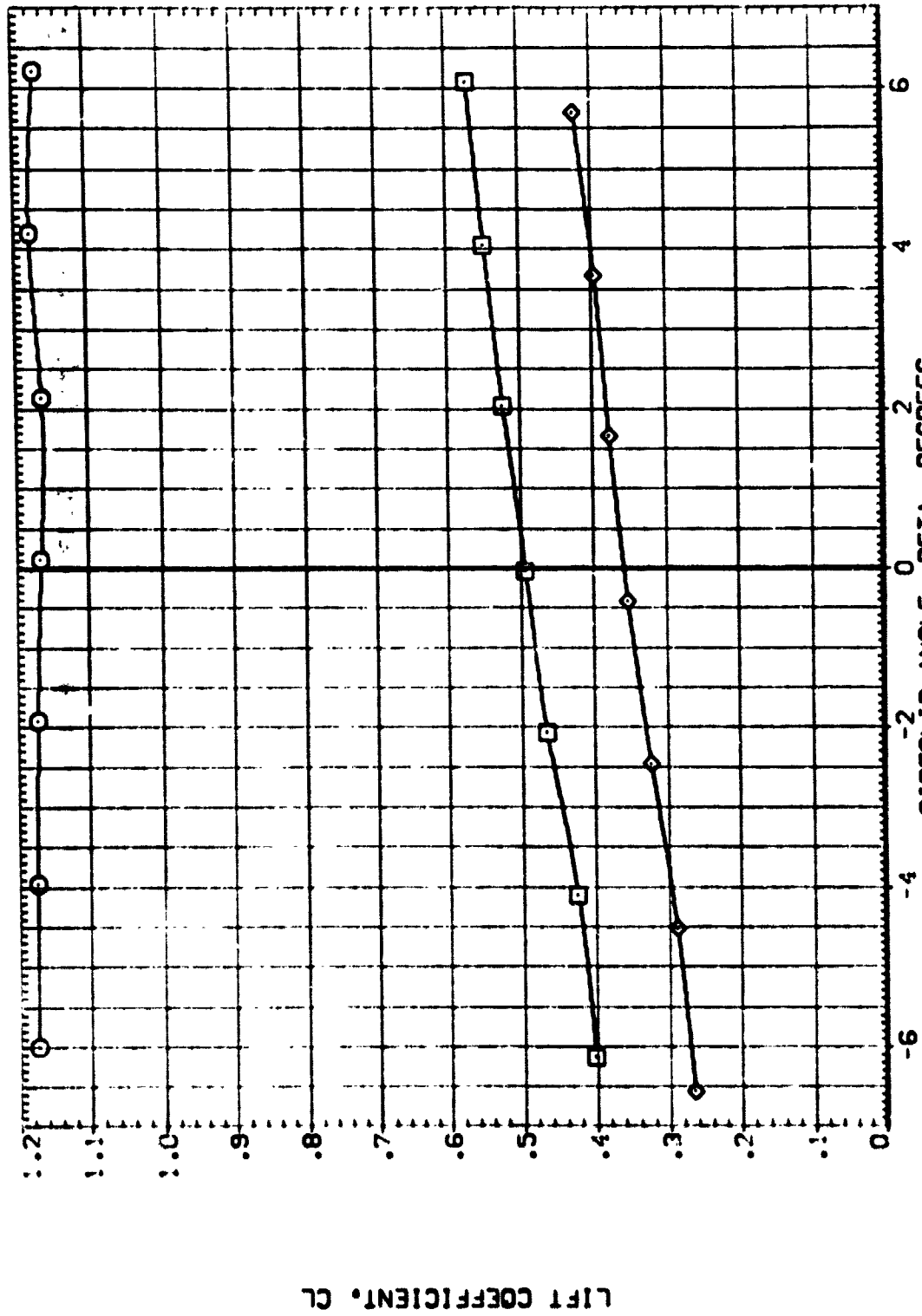


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(3)  $\gamma_{AC} = .70$

DATA SET SYMBOL CONFIGURATION DESCRIPTION

{MFJ008}  
{MFJ009}  
{MFJ010}  
{MFJ011}  
{MFJ012}

VS B2 Y  
VS B2 Y  
VS B2 Y  
DATA NOT AVAILABLE  
DATA NOT AVAILABLE

LAMDA ALPHA  
.000 5.000  
45.000 5.000  
45.000 3.000  
82.000 3.000

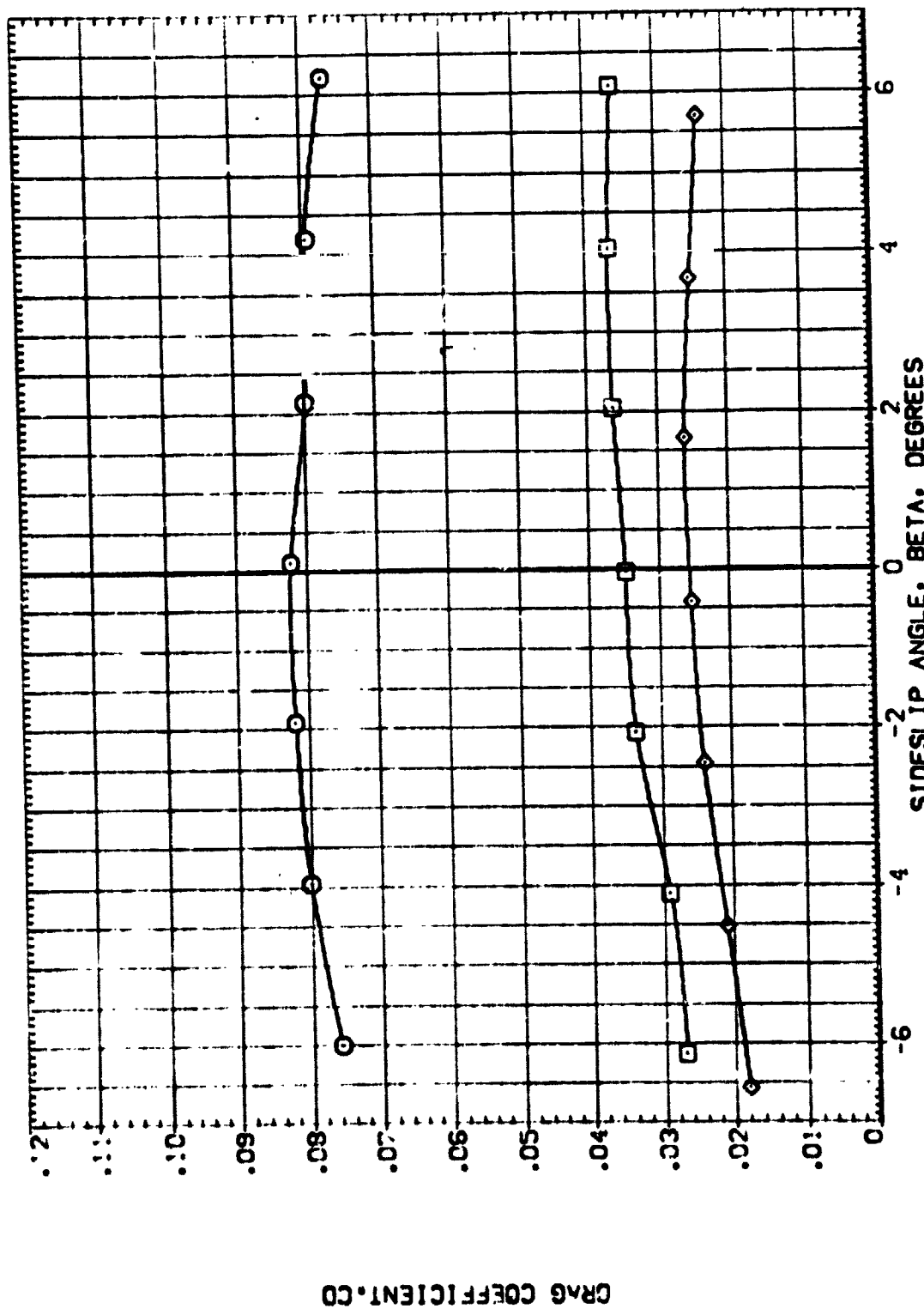


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(B)MACH = .70

DATA SET SYMBOLS: CONFIGURATION DESCRIPTION  
 [RE-1008] VS B2  
 [RE-1009] VS B2  
 [RE-1010] VS B2  
 [RE-1011] DATA NOT AVAILABLE  
 [RE-1012] DATA NOT AVAILABLE

LAMBDA ALPHA  
 .000 5.000  
 .45.000 5.000  
 .45.000 3.000  
 .60.000 3.000

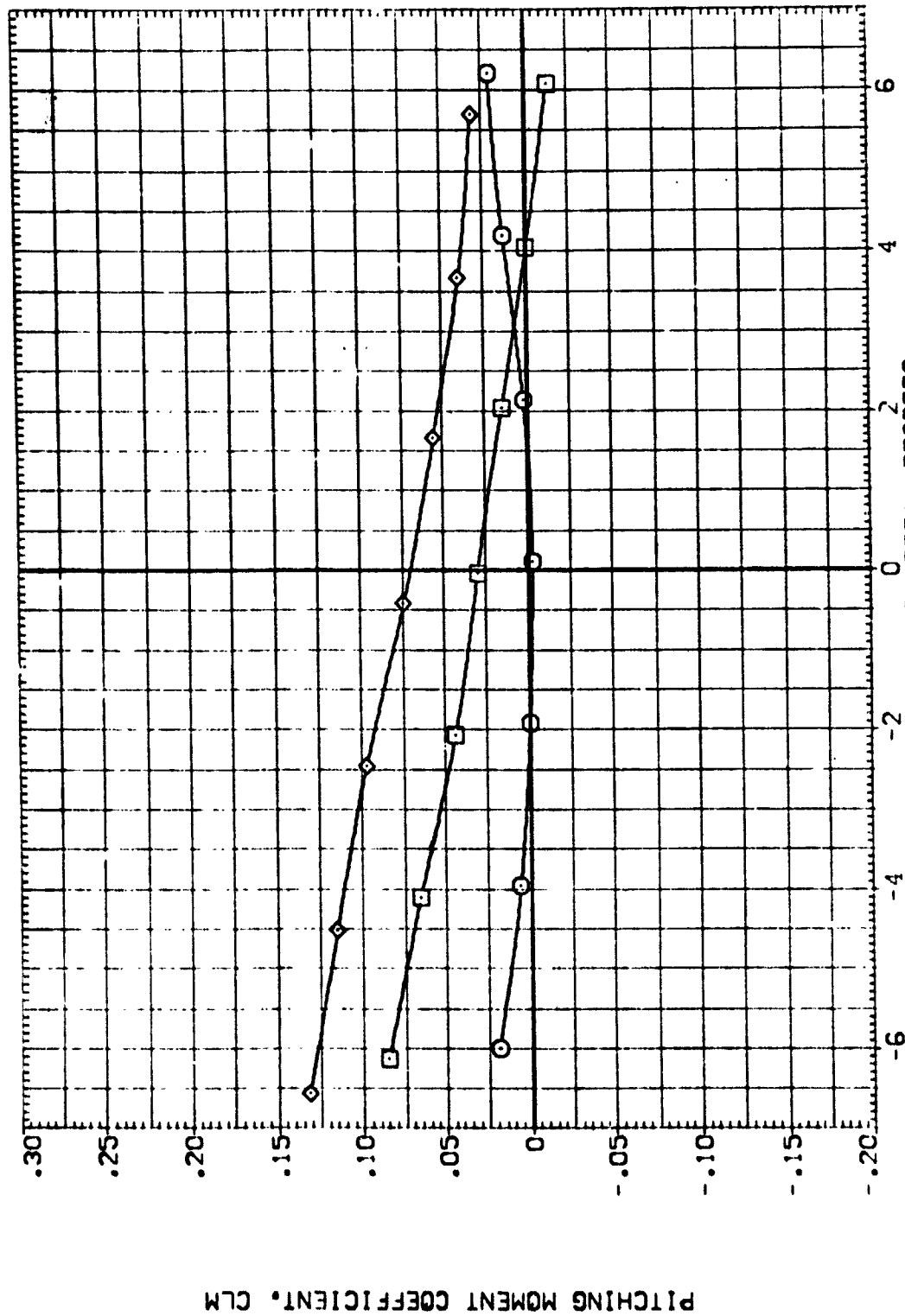


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(B) MACH = .70

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [REJ008] VS 82 T  
 [REJ009] VS 82 T  
 [REJ010] VS 82 T  
 [REJ011] DATA NOT AVAILABLE  
 [REJ012] DATA NOT AVAILABLE

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

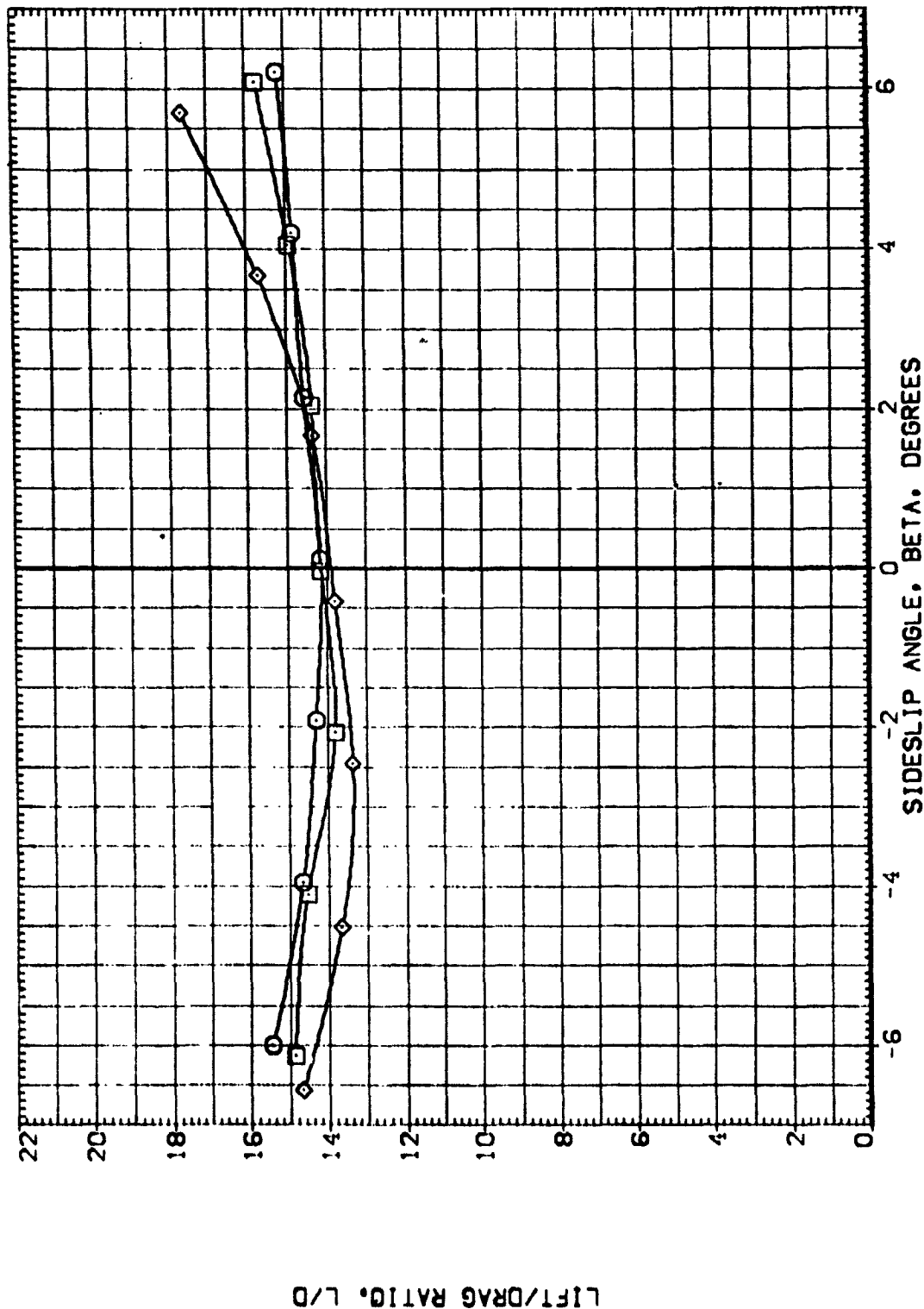


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(B) MACH = .70



DATA SET SYMBO. CONFIGURATION DESCRIPTION  
 [RE-008] Q VS B2 T  
 [RE-009] X VS B2 T  
 [RE-010] X VS B2 T  
 [RE-011] X VS B2 T  
 [RE-012] X VS B2 T

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

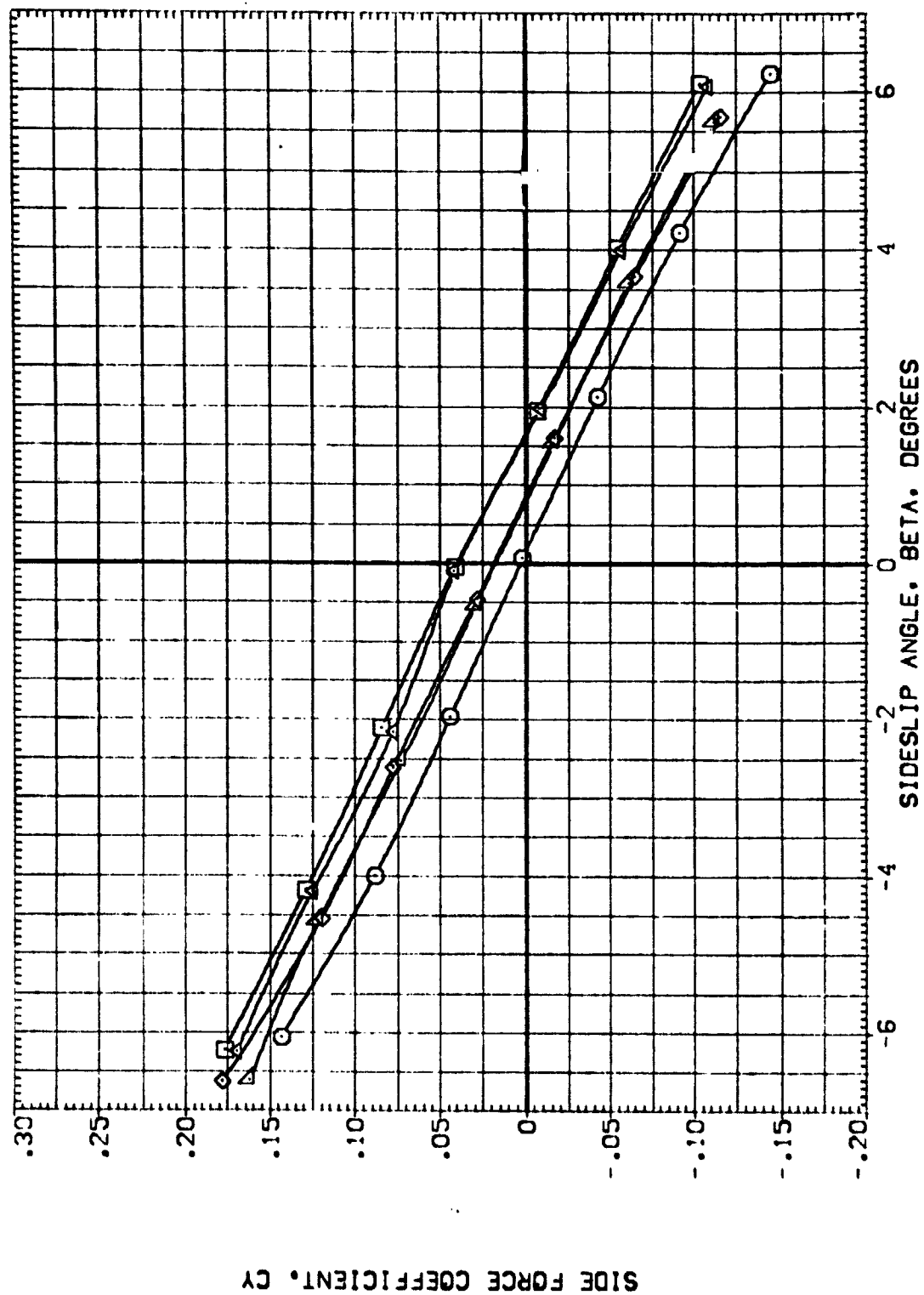


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

$(C)MAC = .80$

DATA SET SYM-3 CONFIGURATION DESCRIPTION  
 Q VS B2 T  
 X VS B2 T  
 X VS B2 T  
 X VS B2 T  
 X VS B2 T

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 60.000 5.000  
 60.000 3.000

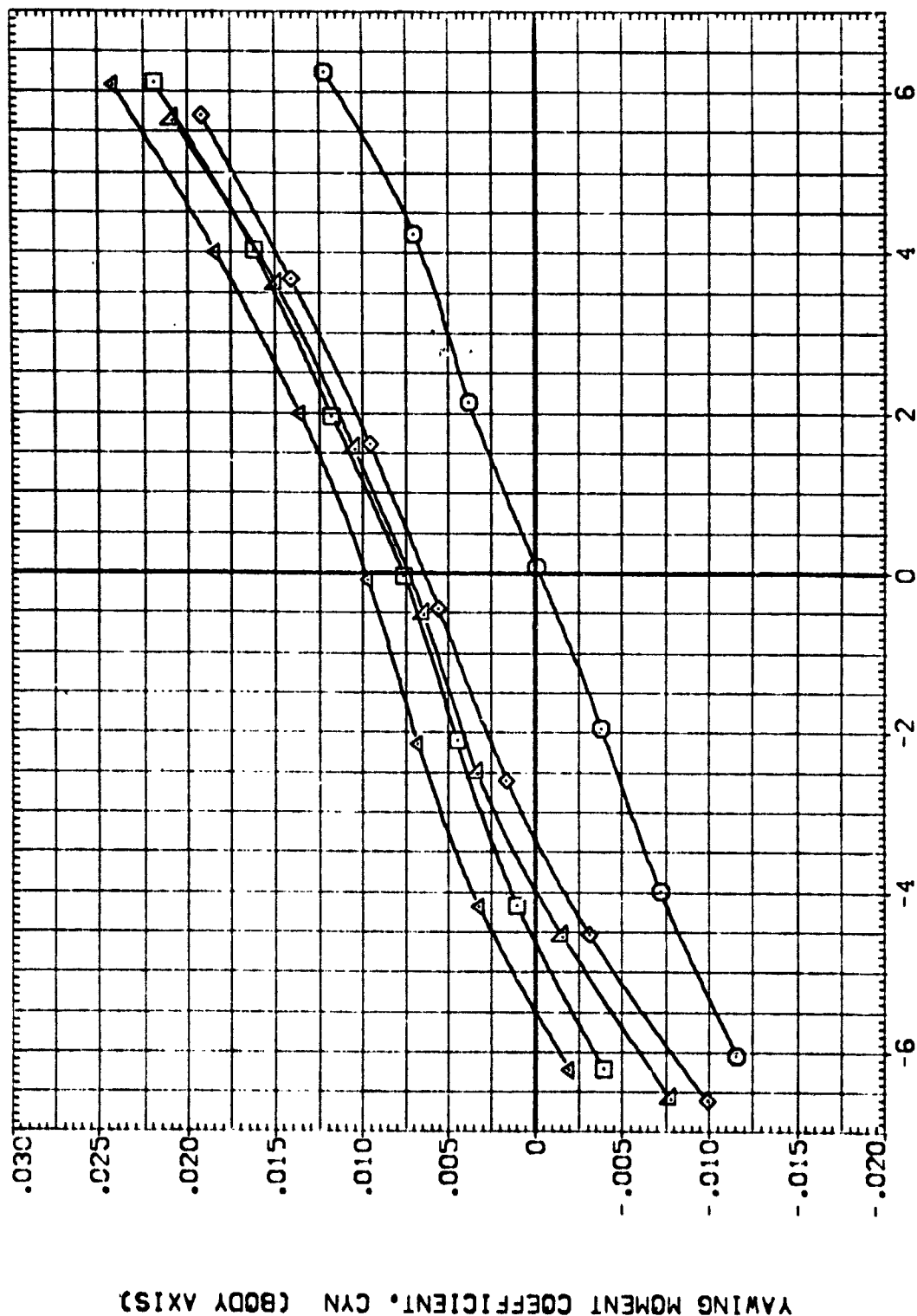


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(C)MACH = .80

DATA SET SYMBO. CONFIGURATION DESCRIPTION  
 (RF-108) VS B2 T  
 (RF-109) VS B2 T  
 (RF-110) VS B2 T  
 (RF-111) VS B2 T  
 (RF-112) VS B2 T

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000

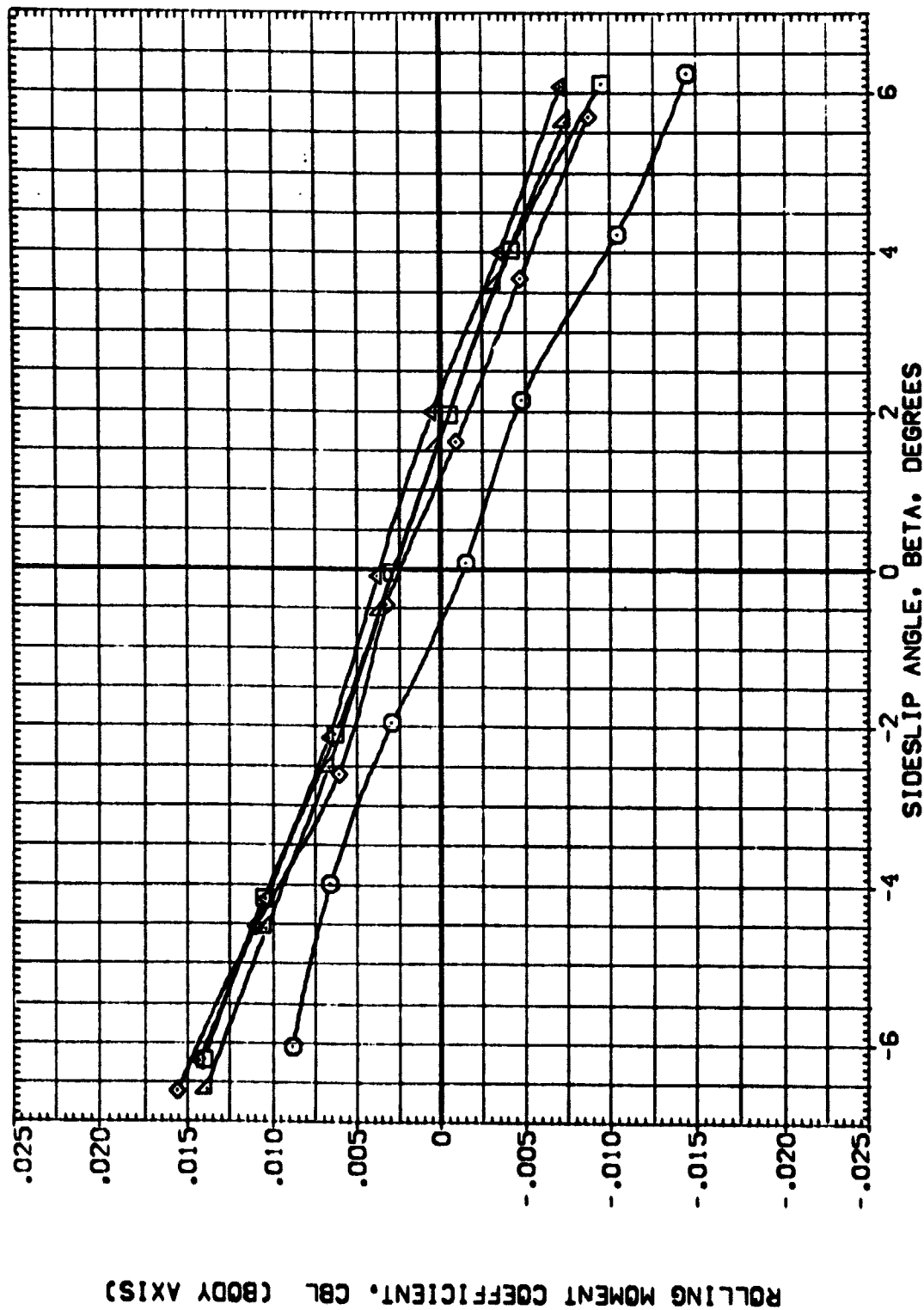


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(C)MACH = .80

DATA SET SYNO. CONFIGURATION DESCRIPTION  
 0000 1  
 0000 1  
 0000 1  
 0000 1  
 0000 1  
 0000 1

LAMDA ALPHA  
 0.00 5.000  
 45.00 5.000  
 45.00 5.000  
 60.00 5.000

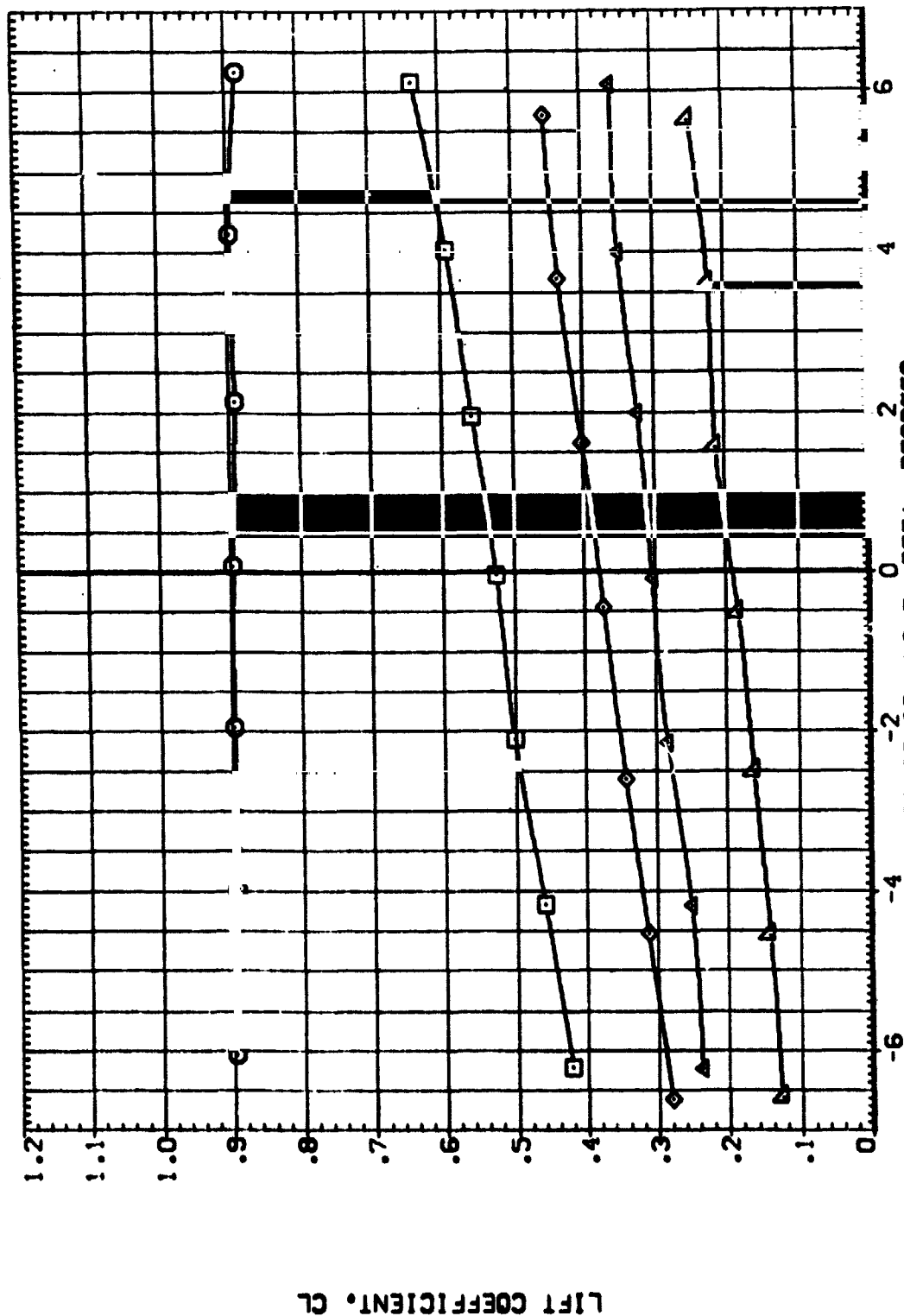


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(C)MACH = .80

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RE:009] VS B2  
 [RE:009] VS B2  
 [RE:010] VS B2  
 [RE:011] VS B2  
 [RE:012] VS B2

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 60.000 3.000  
 60.000 3.000

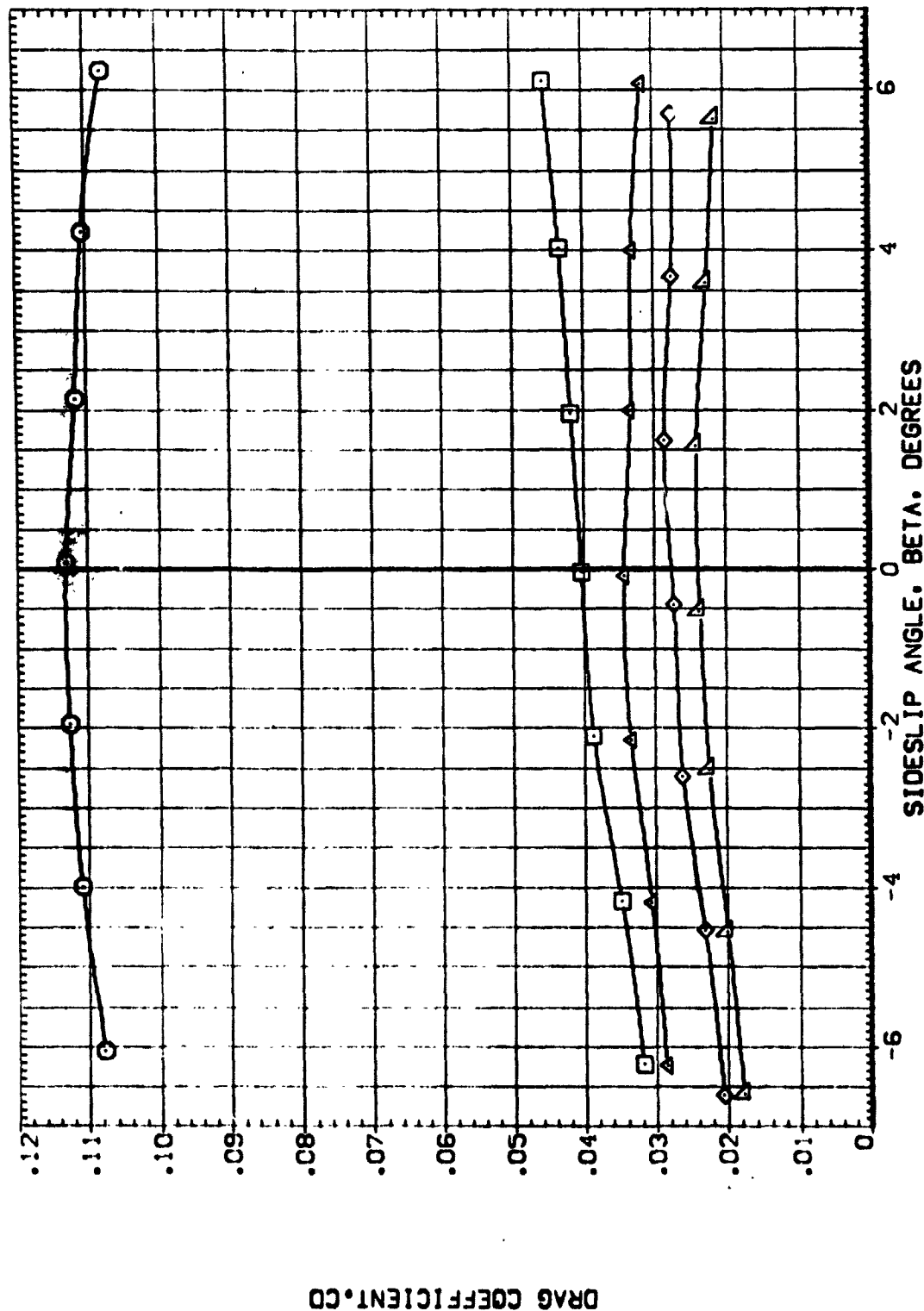


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(C)MAC = .8C

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 181  
 {R1008} VS 22  
 {R1009} VS 22  
 {R1010} VS 22  
 {R1011} VS 22  
 {R1012} VS 22

LAMBDA ALPHA  
 .000 5.000  
 .45.000 5.000  
 .45.000 3.000  
 .60.000 3.000

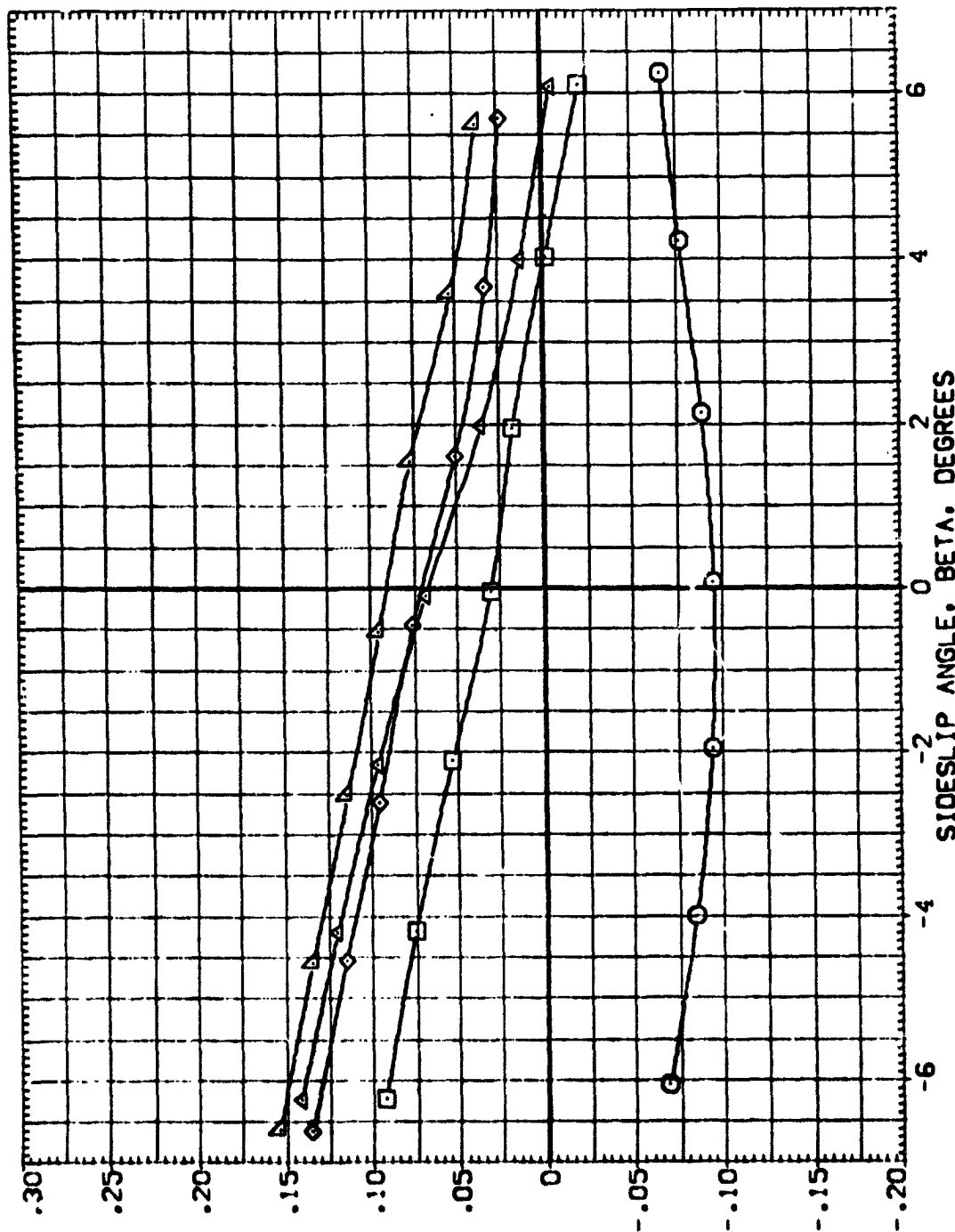


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(C)MACH = .80

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (REF 1008) VS B2 T  
 (REF 1009) VS B2 T  
 (REF 1010) VS B2 T  
 (REF 1011) VS B2 T  
 (REF 1012) VS B2 T

LAMBDA ALPHA  
 .000 5.000  
 .45.000 5.000  
 .60.000 5.000  
 .80.000 5.000

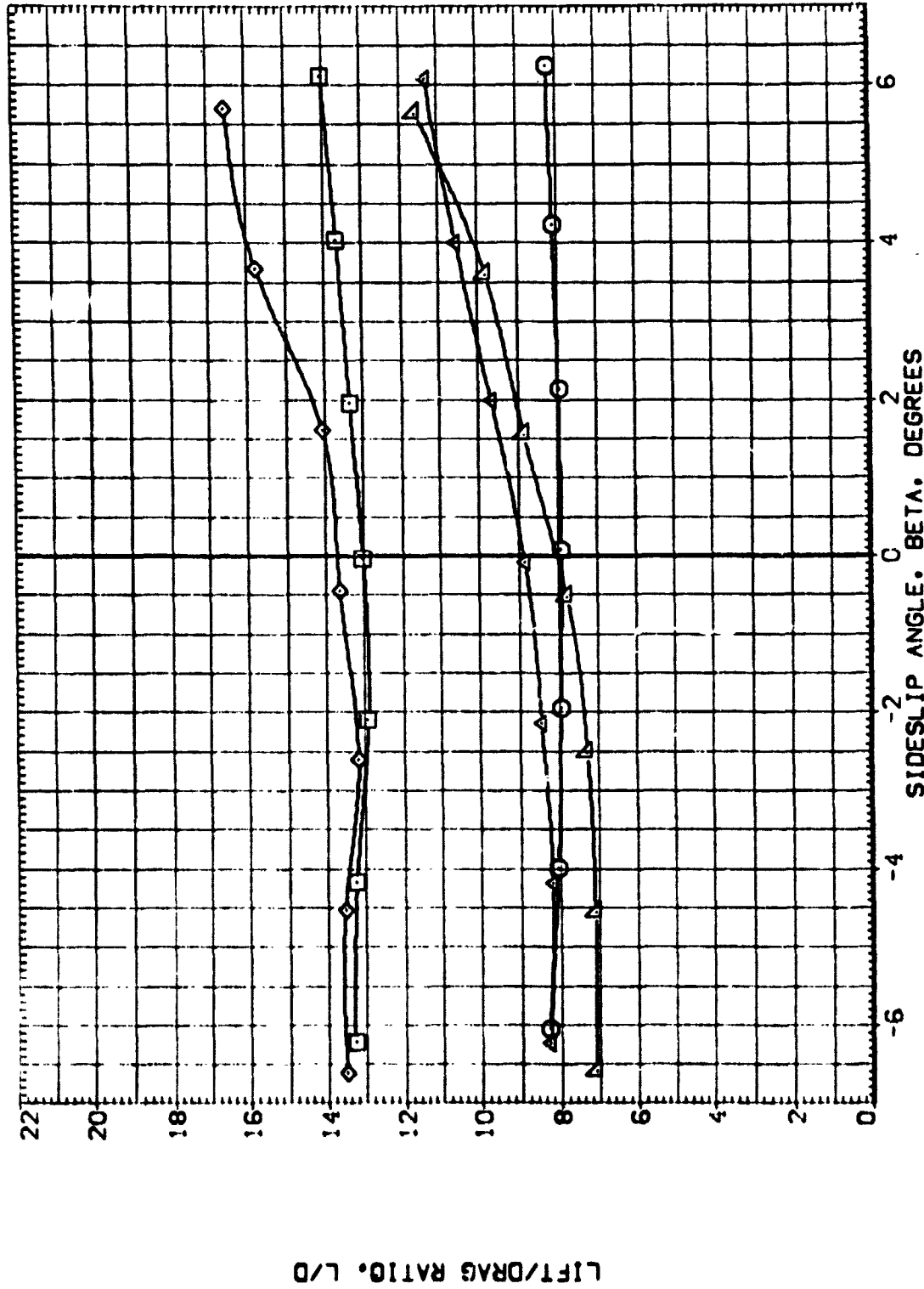


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(C)MACH = .80

DATA SET SYMBOL    CONFIGURATION DESCRIPTION  
 [REF-0009]    DATA NOT AVAILABLE  
 [REF-0010]    VS 82  
 [REF-0011]    VS 82  
 [REF-0012]    VS 82

LAMDA    ALPHA  
 .000    5.000  
 .45.000    5.000  
 .45.000    3.000  
 .60.000    5.000  
 .60.000    3.000

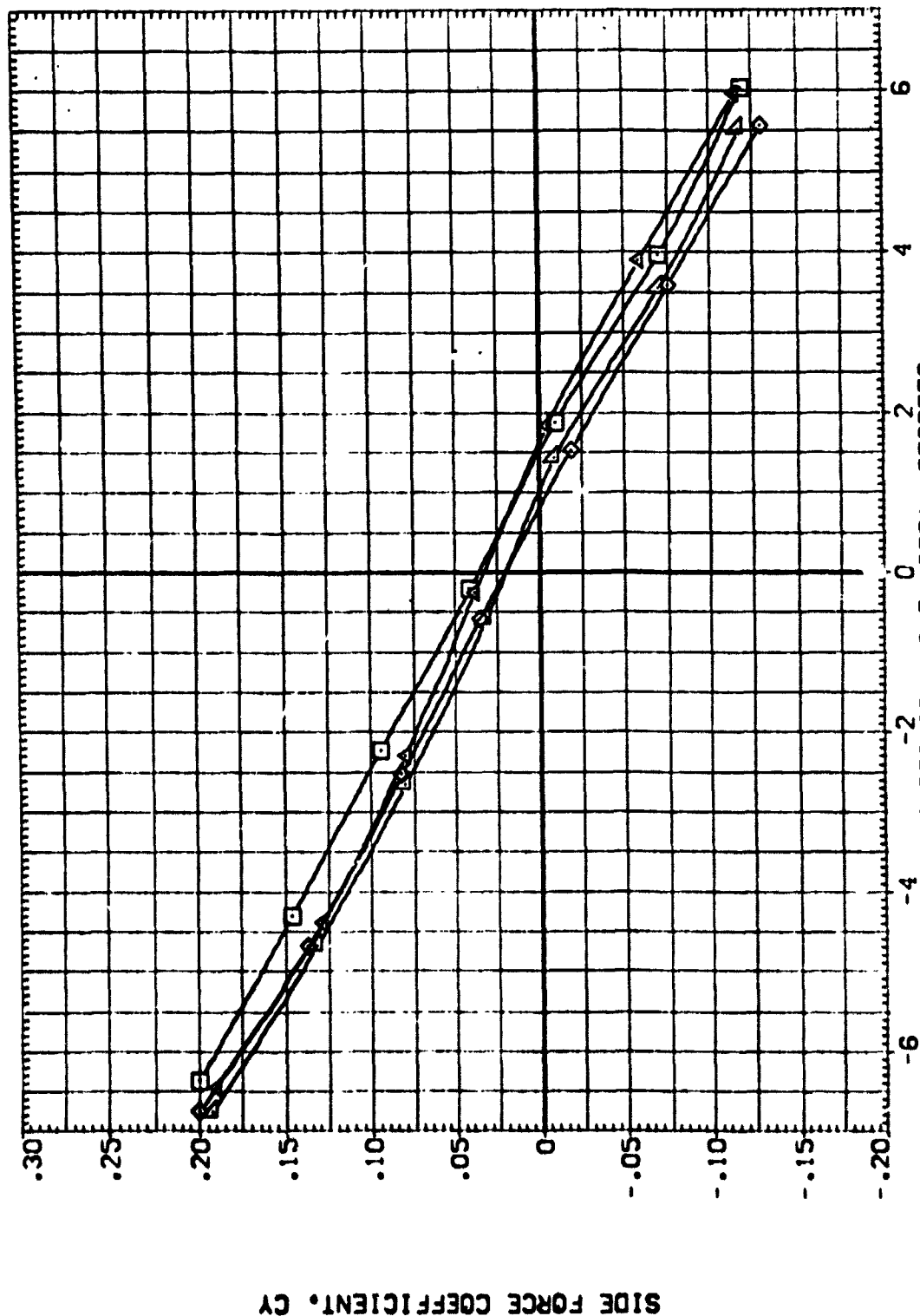


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(C)MAC = .95



DATA SET SYMB. CONFIGURATION DESCRIPTION  
 [00000] DATA NOT AVAILABLE  
 [00001] 1  
 [00002] 2  
 [00003] 3  
 [00004] 4

LAMDA ALPHA  
 0.000 0.000  
 0.000 0.000  
 0.000 0.000  
 0.000 0.000

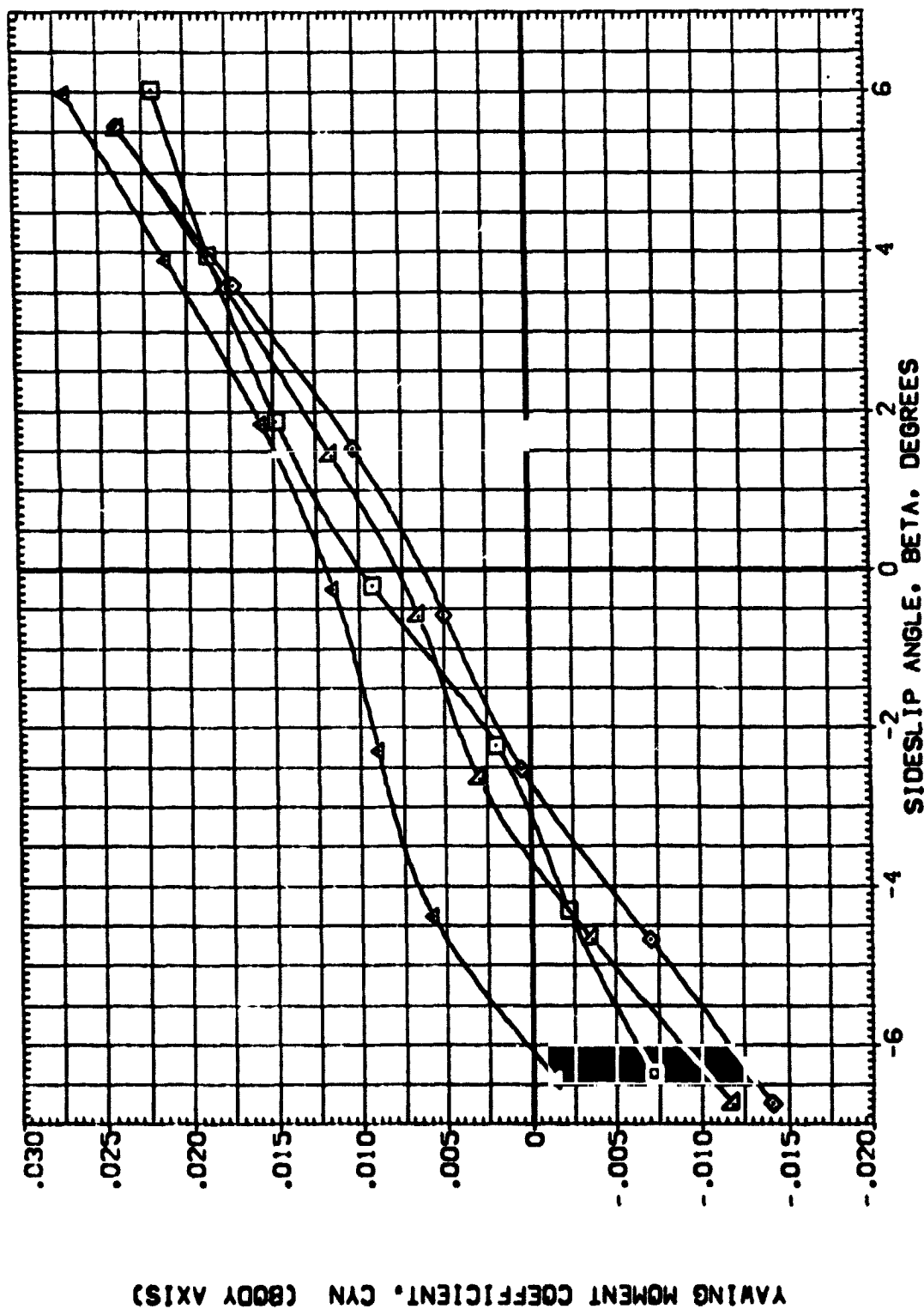


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(0)MACH = .95

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 {0} DATA NOT AVAILABLE  
 {X} VS 00 Y  
 {X} VS 00 Y  
 {X} VS 00 Y  
 {X} VS 00 Y

LAMDA ALPHA  
 .000 5.000  
 .000 5.000  
 .000 5.000  
 .000 5.000

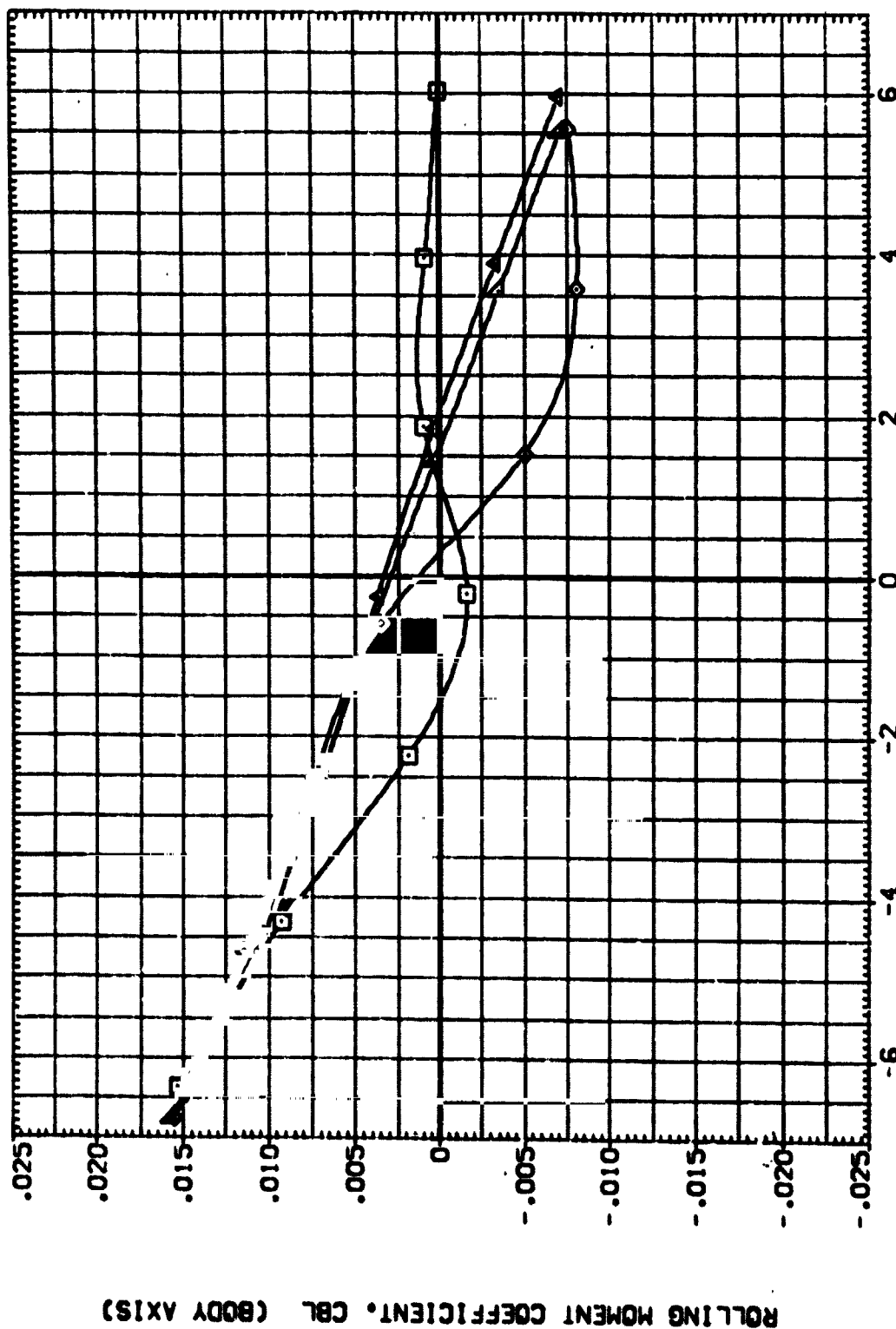


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

{0}MACH = .95

DATA SET SYNO. CONFIGURATION DESCRIPTION  
 [RE:008] DATA NOT AVAILABLE  
 [RE:009] VS B2  
 [RE:010] VS B2  
 [RE:011] VS B2  
 [RE:012] VS B2

LAMDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 5.000  
 60.000 5.000

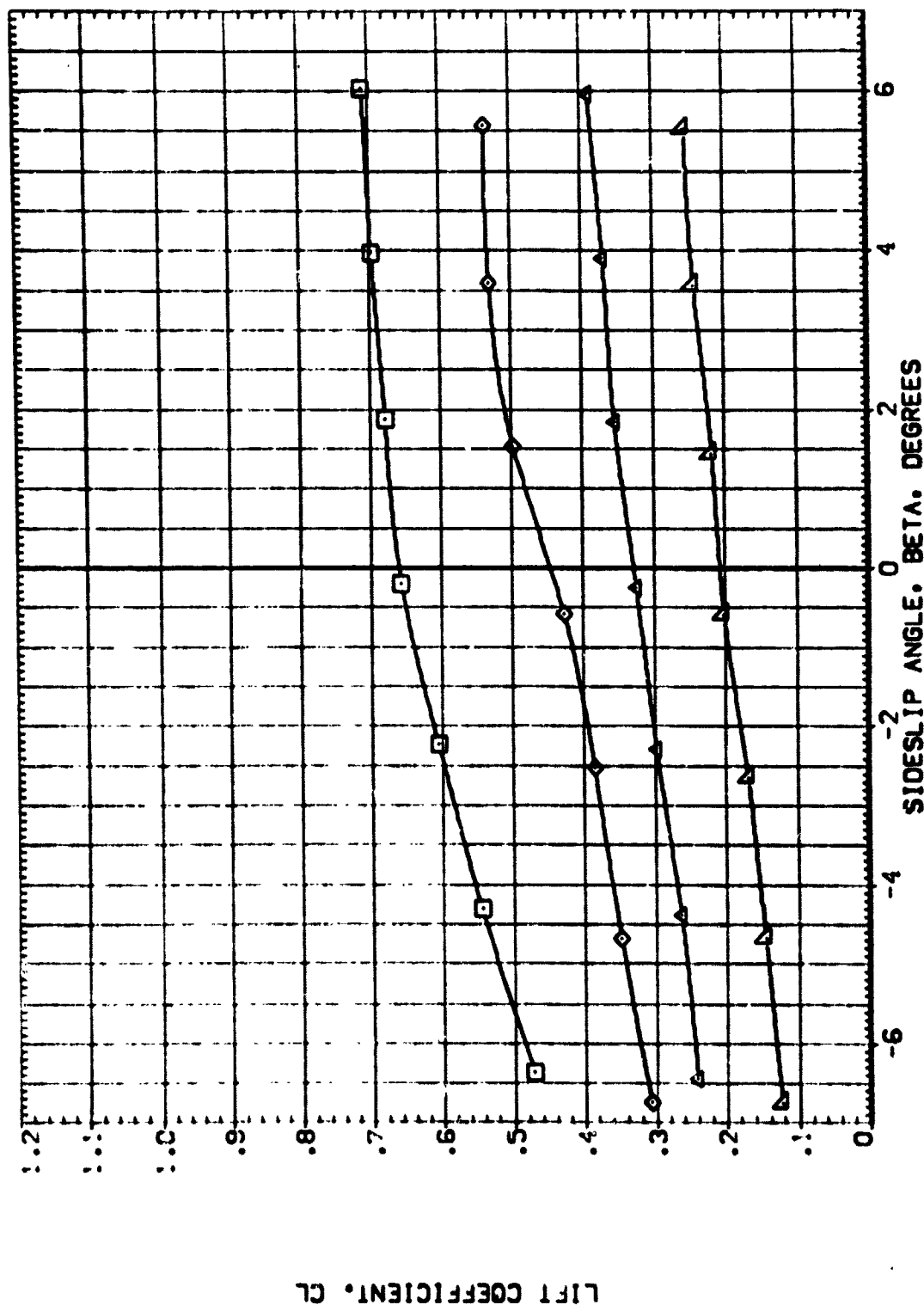


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(C)MACH = .95

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [05-008] DATA NOT AVAILABLE  
 [05-009] 15 82 1  
 [05-010] 15 82 1  
 [05-011] 15 82 1  
 [05-012] 15 82 1

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 5.000  
 60.000 5.000

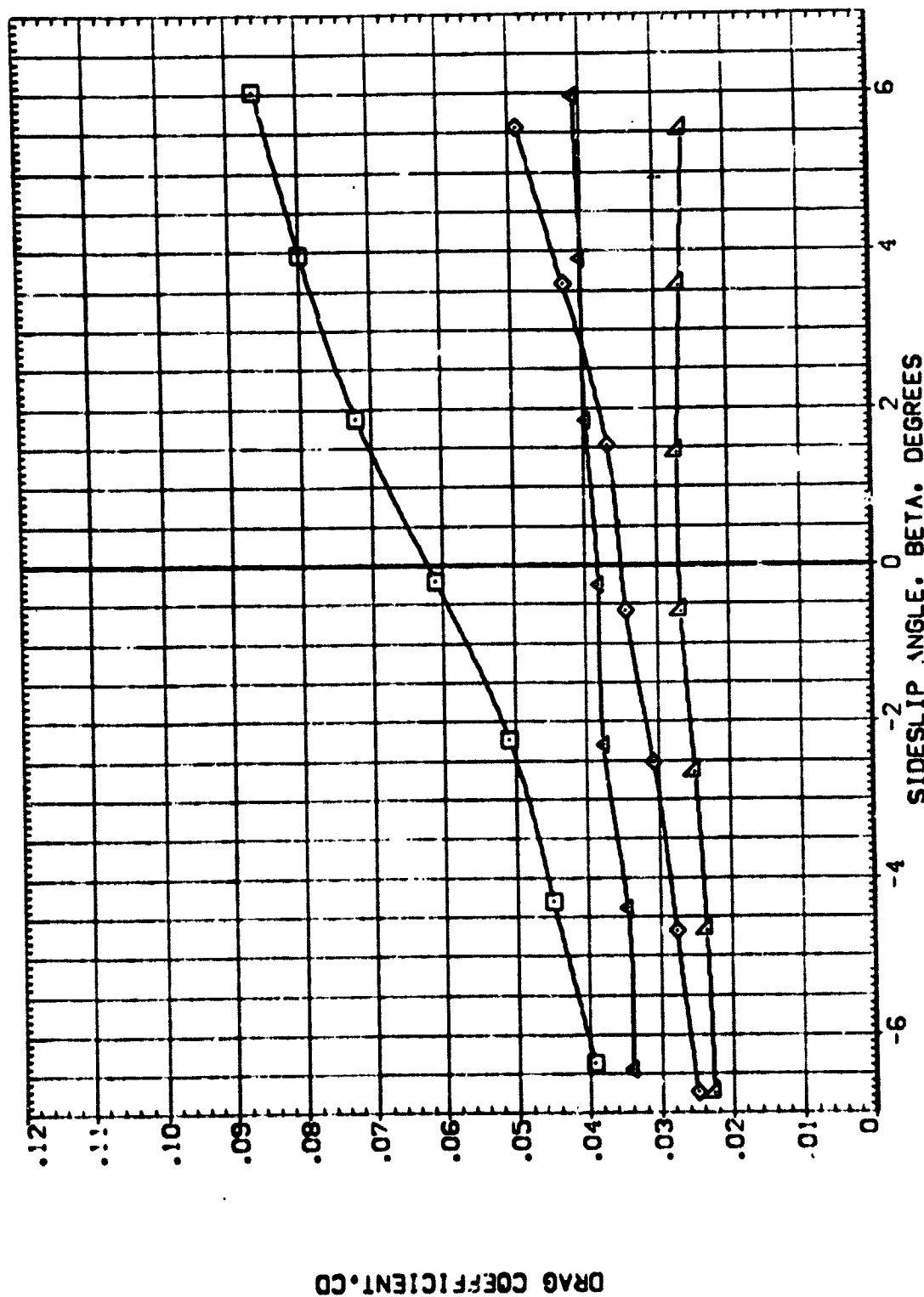


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(CD)MACH = .95

DATA SET SYMBO. CONFIGURATION DESCRIPTION  
 [R:1008] O DATA NOT AVAILABLE  
 [R:1009] VS B2  
 [R:1010] VS B2  
 [R:1011] VS B2  
 [R:1012] VS B2

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 5.000  
 60.000 5.000

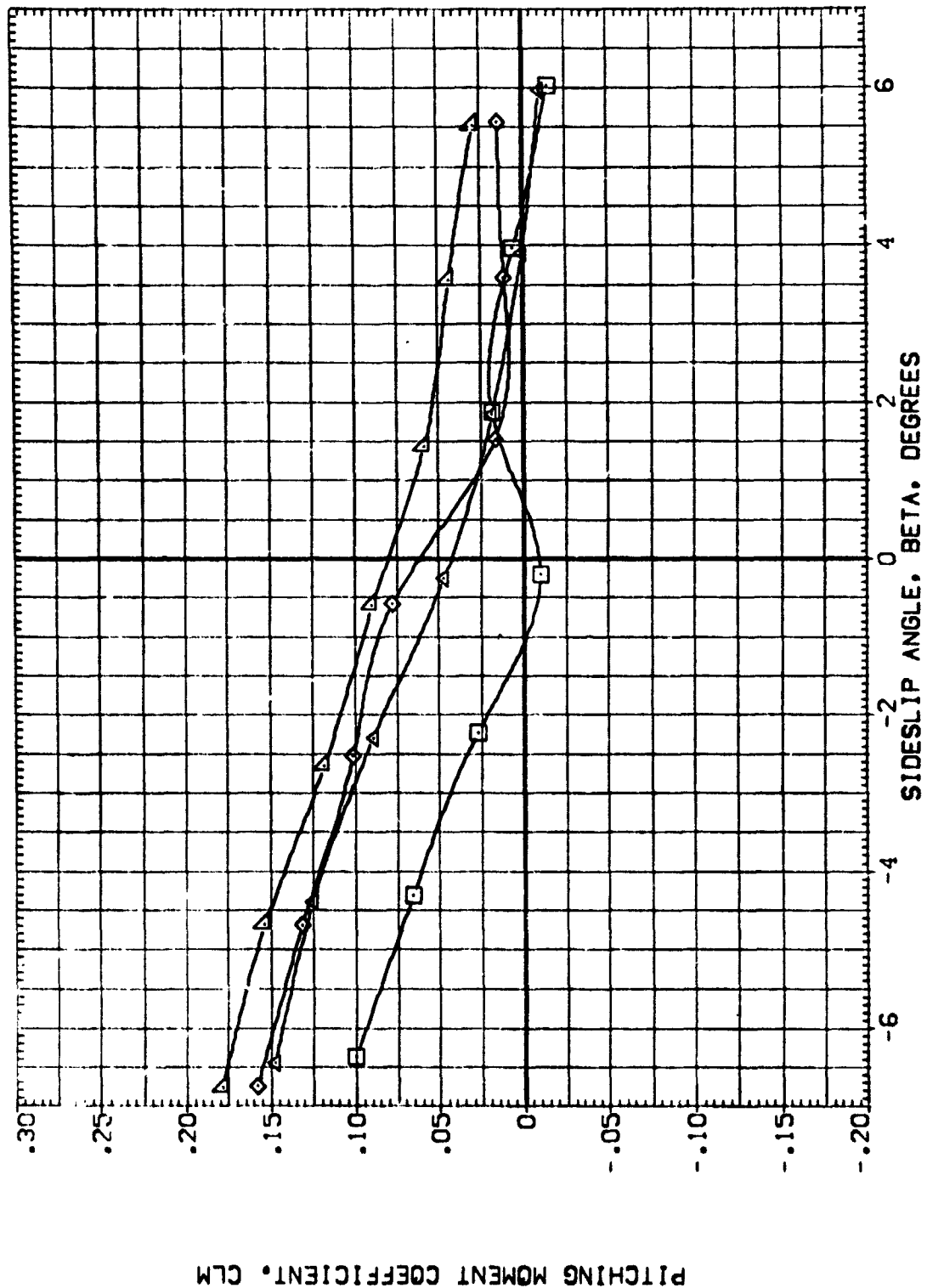


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDELIP- 12-PERCENT-THICK WING.

(M)MACH = .95

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [NF-J008] DATA NOT AVAILABLE  
 [NF-J009] V5 B2 T  
 [NF-J010] V5 B2 T  
 [NF-J011] V5 B2 T  
 [NF-J012] V5 B2 T

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 60.000 5.000  
 60.000 3.000

LIFT/DRAG RATIO, L/D

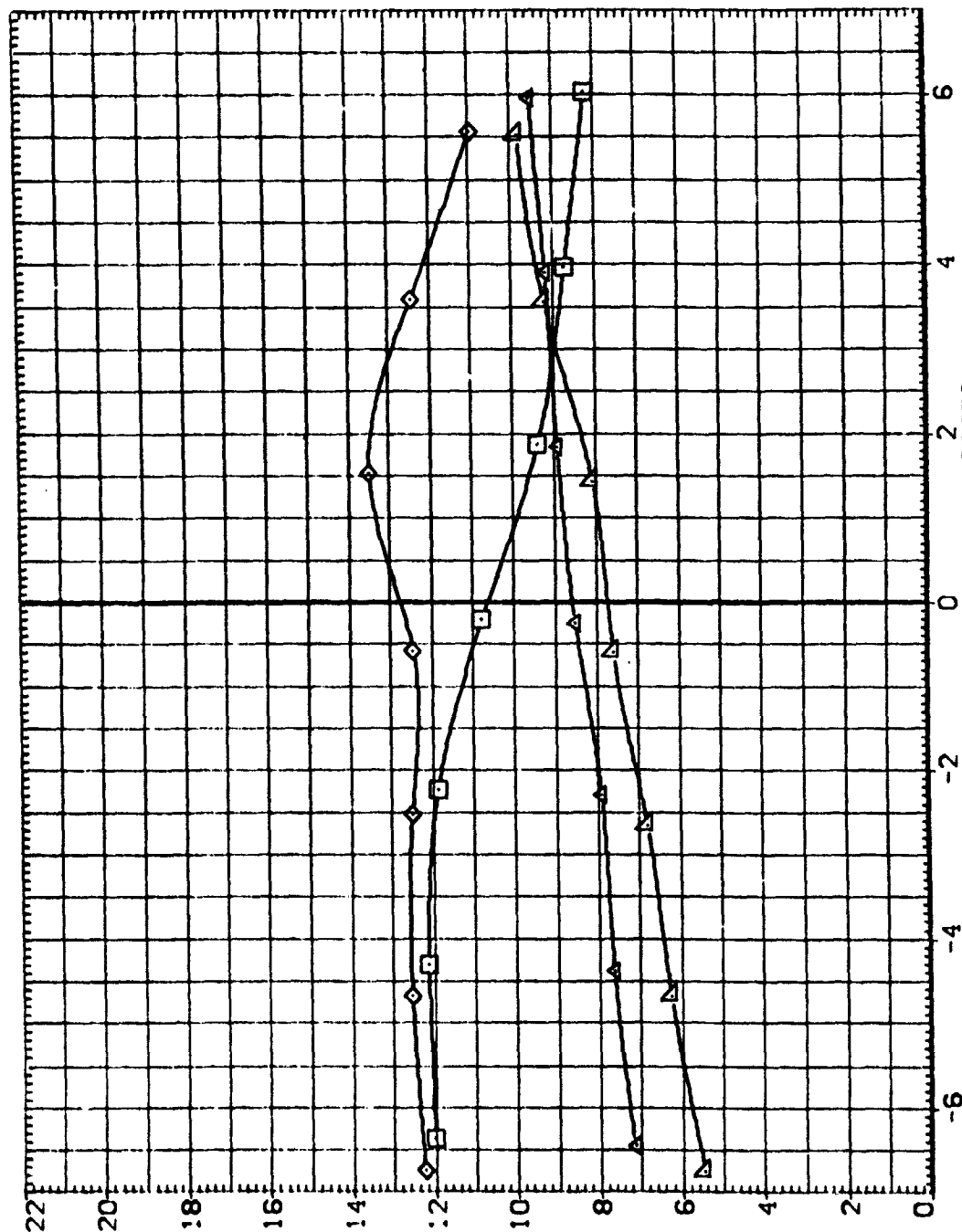


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(C)MACH = .95

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RF-008] DATA NOT AVAILABLE  
 [RF-009] VS 32  
 [RF-010] VS 32  
 [RF-011] VS 32  
 [RF-012] VS 32

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

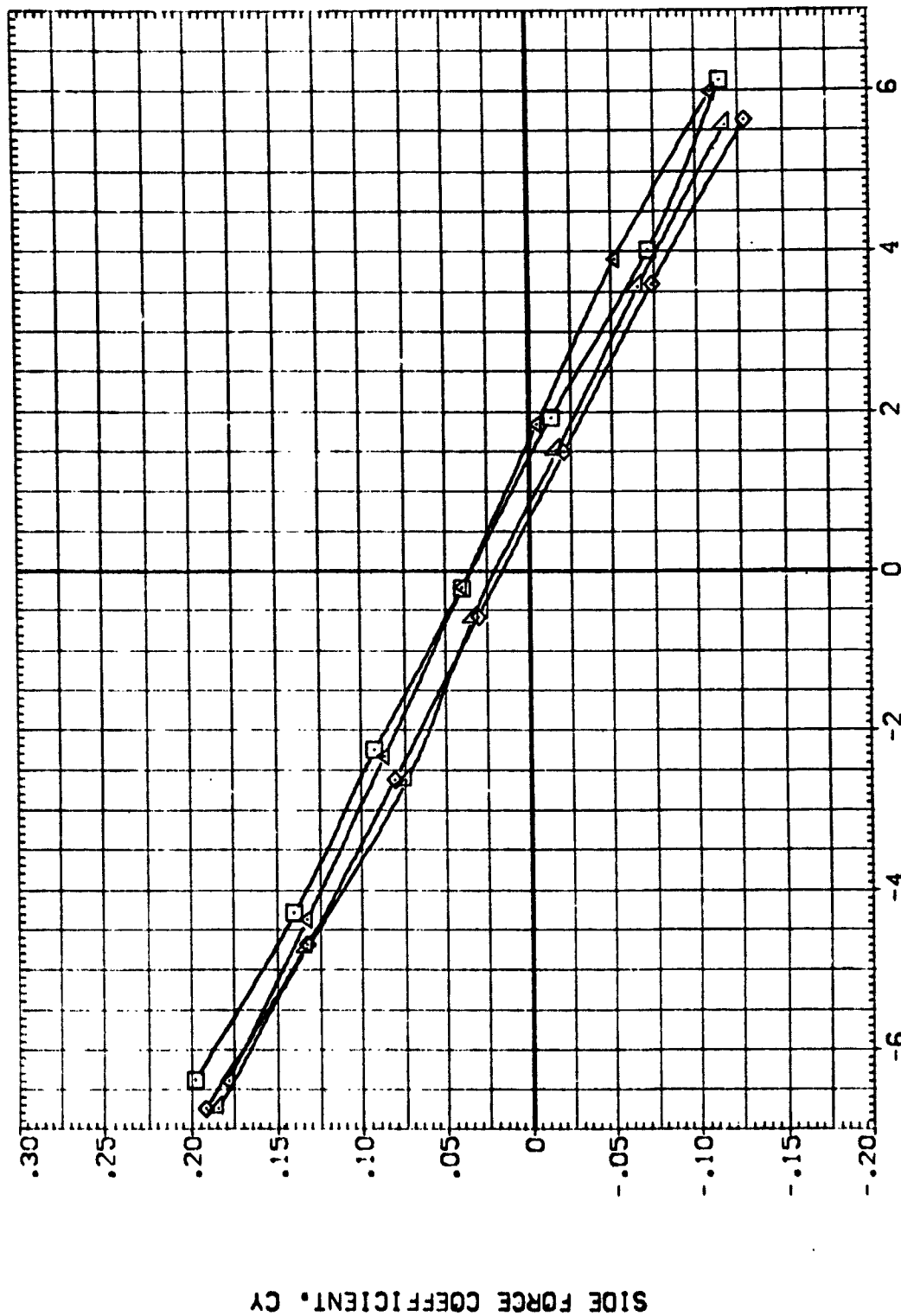


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(E)MACH = .98

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [HJ008] DATA NOT AVAILABLE  
 [HJ009] VS B2  
 [HJ010] VS B2  
 [HJ011] VS B2  
 [HJ012] VS B2

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 5.000  
 60.000 5.000

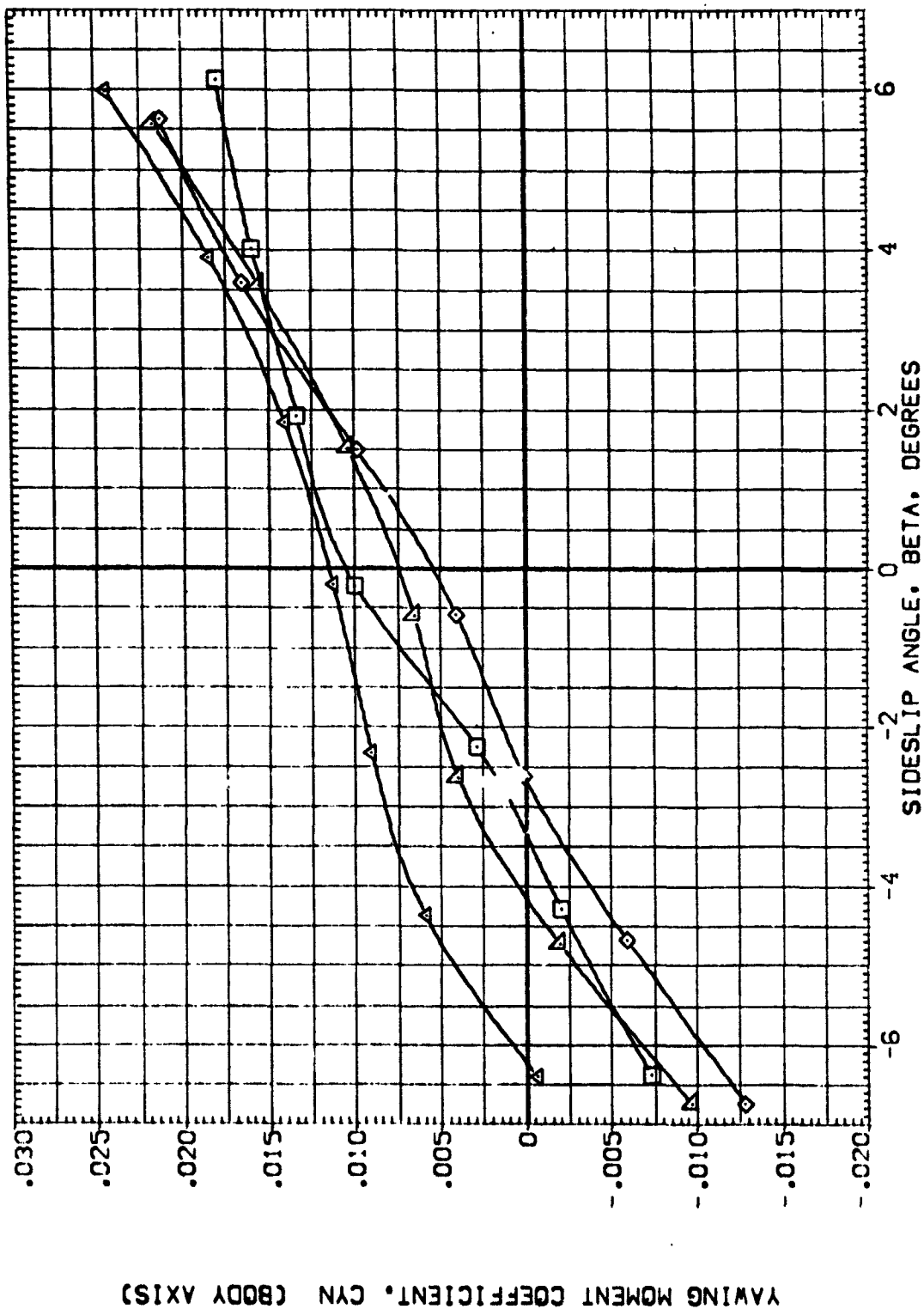


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(E)MACH = .98



DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RE-008] DATA NOT AVAILABLE  
 [RE-009] VS B2  
 [RE-010] VS B2  
 [RE-011] VS B2  
 [RE-012] VS B2

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 3.000

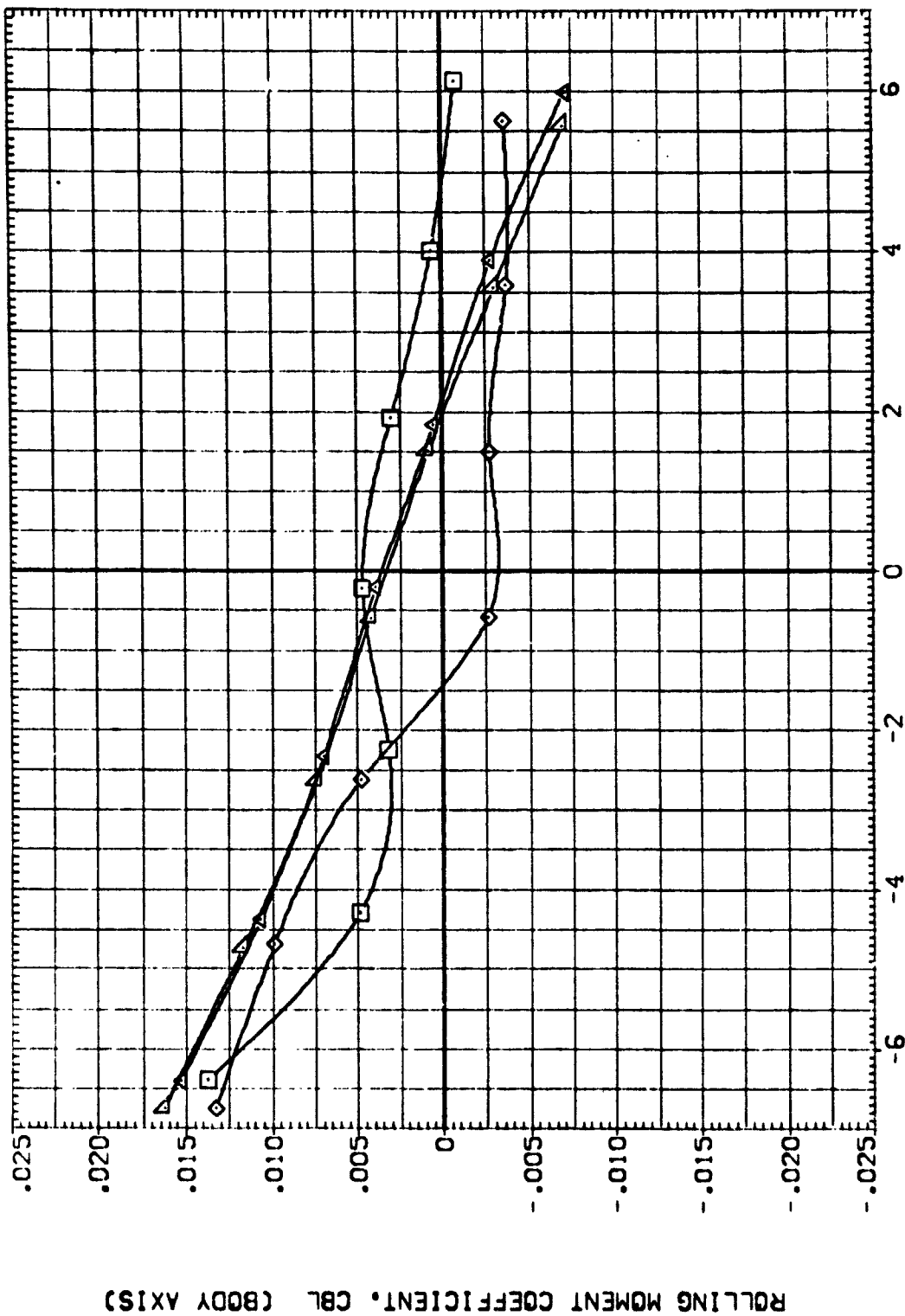


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(E)MACH = .98

DATA SET SYMBO. CONFIGURATION DESCRIPTION  
 [R-1008] DATA NOT AVAILABLE  
 [R-1009] VS B2  
 [R-1010] VS B2  
 [R-1011] VS B2  
 [R-1012] VS B2

LAMDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

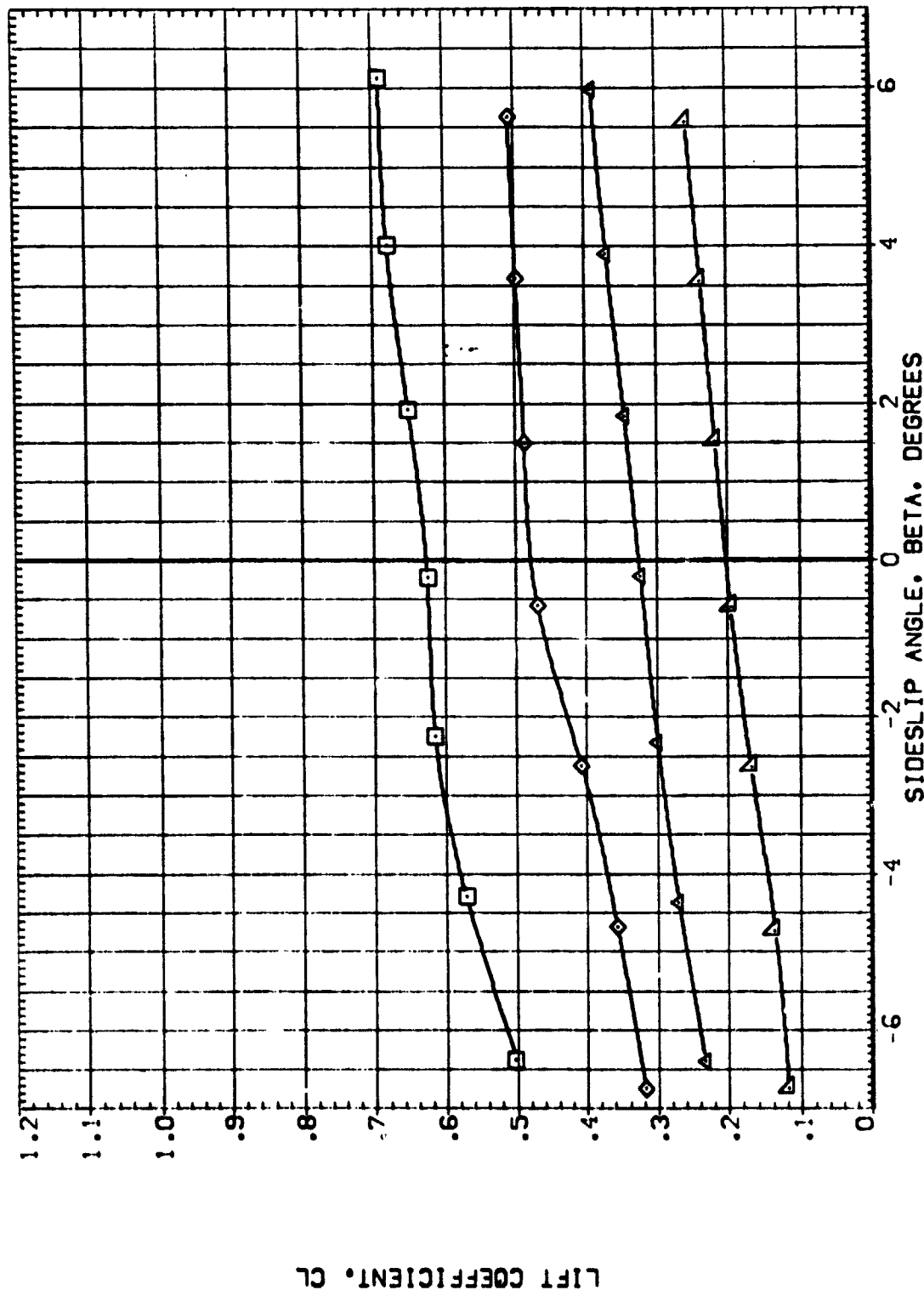


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(E)MACH = .98

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (REF:008) DATA NOT AVAILABLE  
 (REF:009) VS B2  
 (REF:010) VS B2  
 (REF:011) VS B2  
 (REF:012) VS B2

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

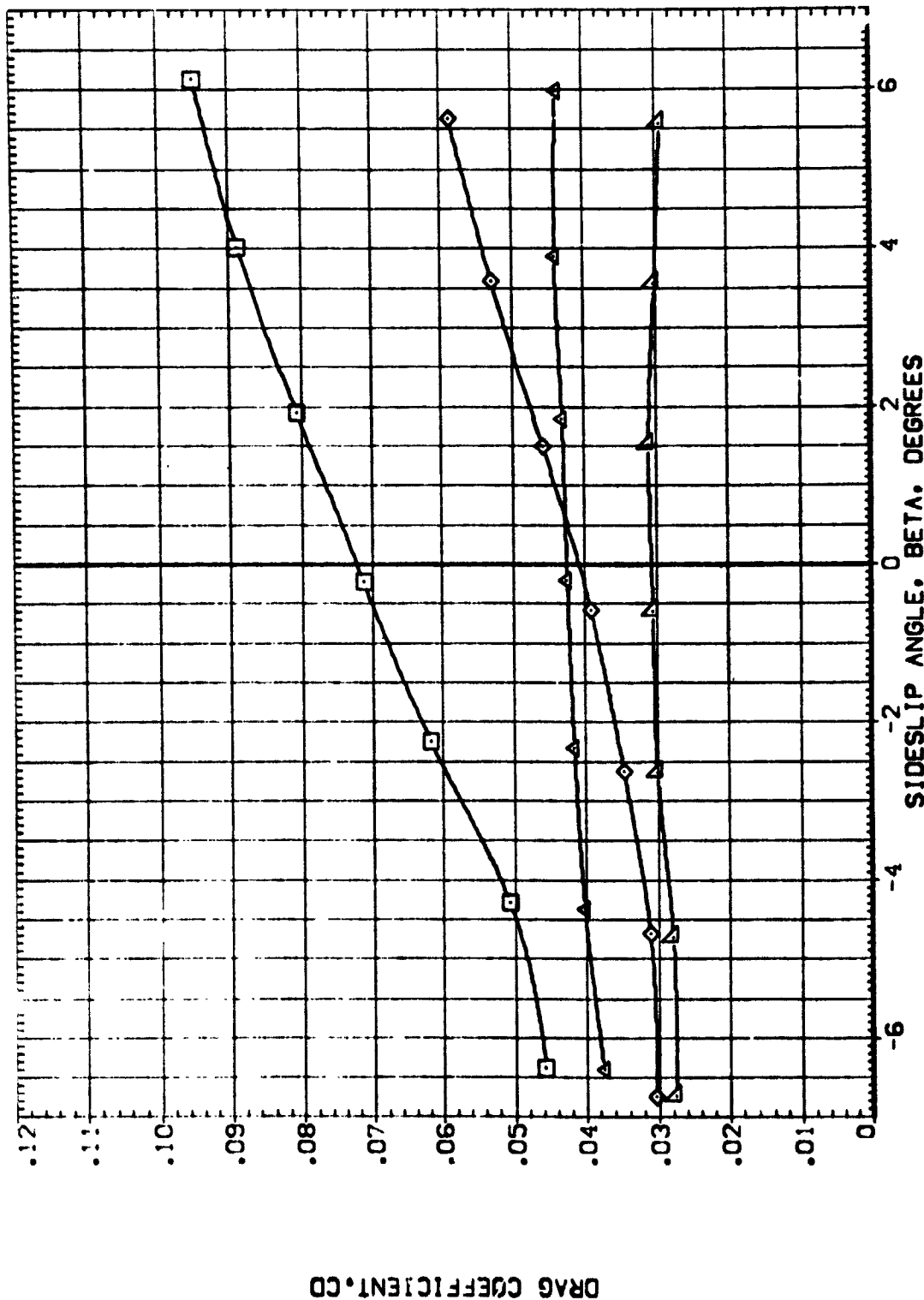


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(E)MACH = .98

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [ # J008 ] DATA NOT AVAILABLE  
 [ # J009 ] VS B2  
 [ # J010 ] VS B2  
 [ # J011 ] VS B2  
 [ # J012 ] VS B2

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.070  
 60.000 5.000  
 60.000 3.000

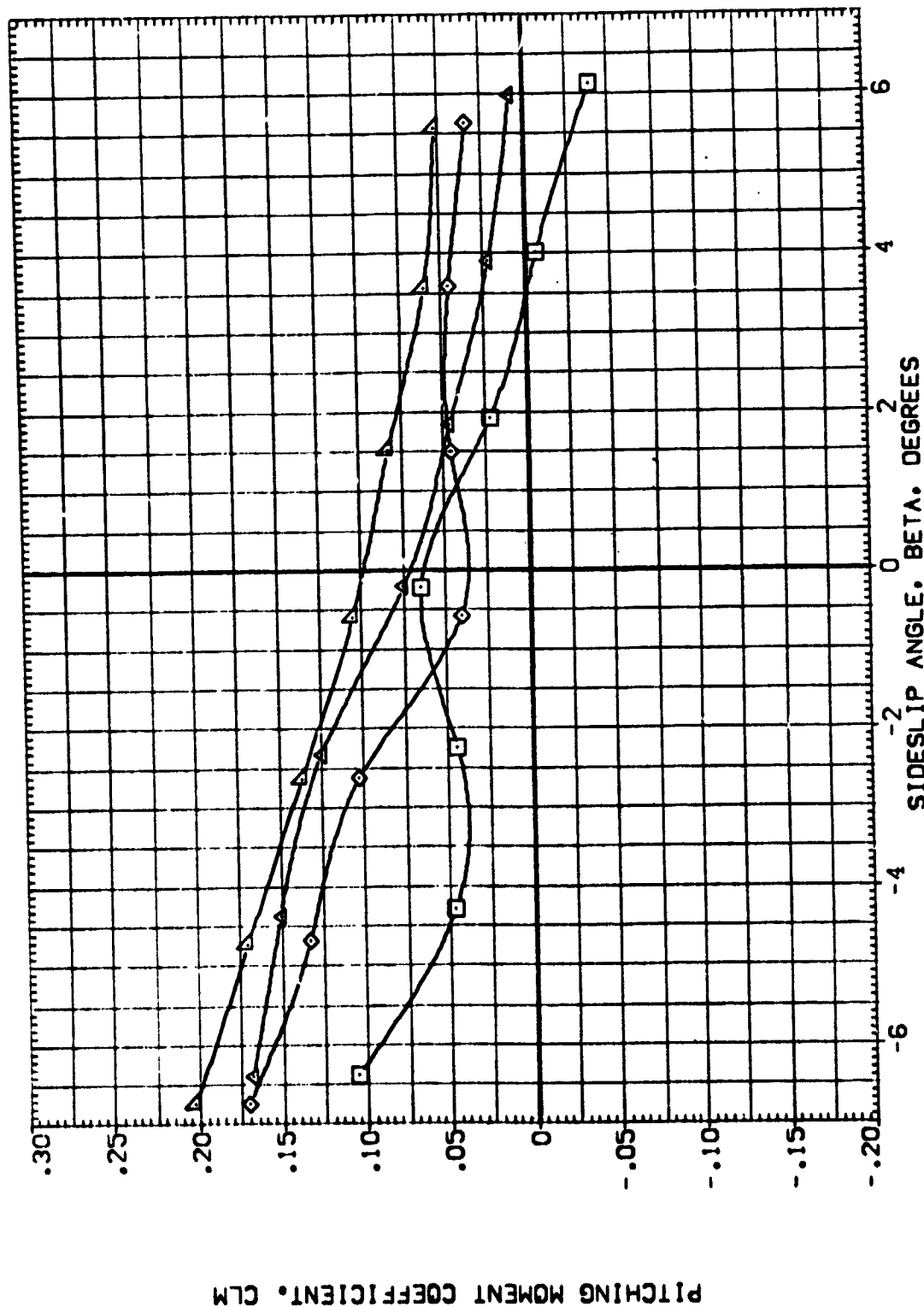


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(E)MACH = .98

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [0008] DATA NOT AVAILABLE  
 [0009] 15 B2 T  
 [0010] 15 B2 T  
 [0011] 15 B2 T  
 [0012] 15 B2 T

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000

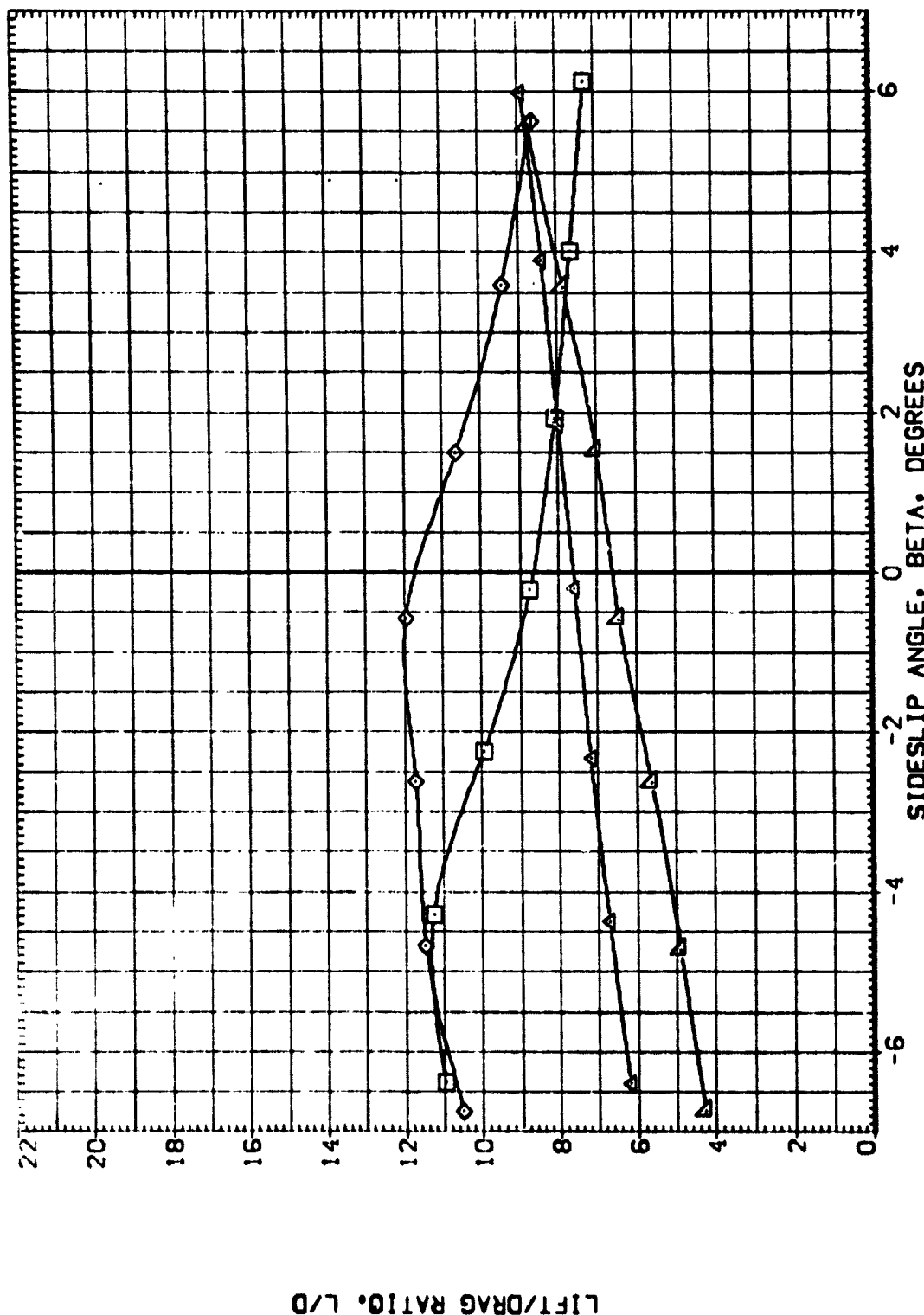


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

CEMACH = .98

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 {84.008} DATA NOT AVAILABLE  
 {85.009} VS B2 Y  
 {86.010} VS B2 Y  
 {87.011} VS B2 Y  
 {88.012} VS B2 Y

LAMDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 5.000  
 60.000 5.000

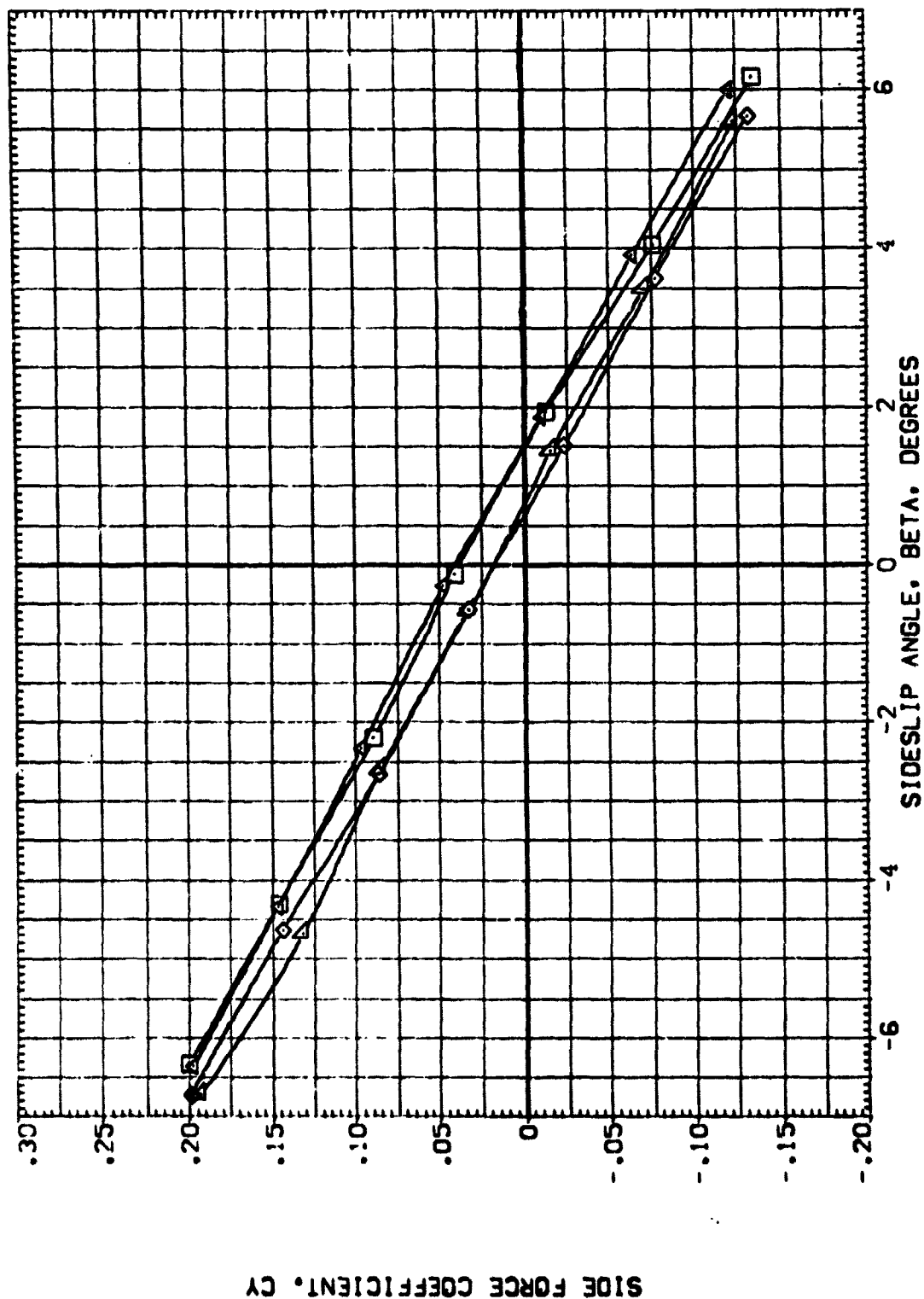


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(F)MACH = 1.05

DATA SET SYMB. CONFIGURATION DESCRIPTION  
 [RE-1008] DATA NOT AVAILABLE  
 [RE-1009] 45 DEGREE  
 [RE-1010] 45 DEGREE  
 [RE-1011] 45 DEGREE  
 [RE-1012] 45 DEGREE

LAMDA ALPHA  
 .000 5.000  
 .000 5.000  
 .000 5.000  
 .000 5.000  
 .000 5.000

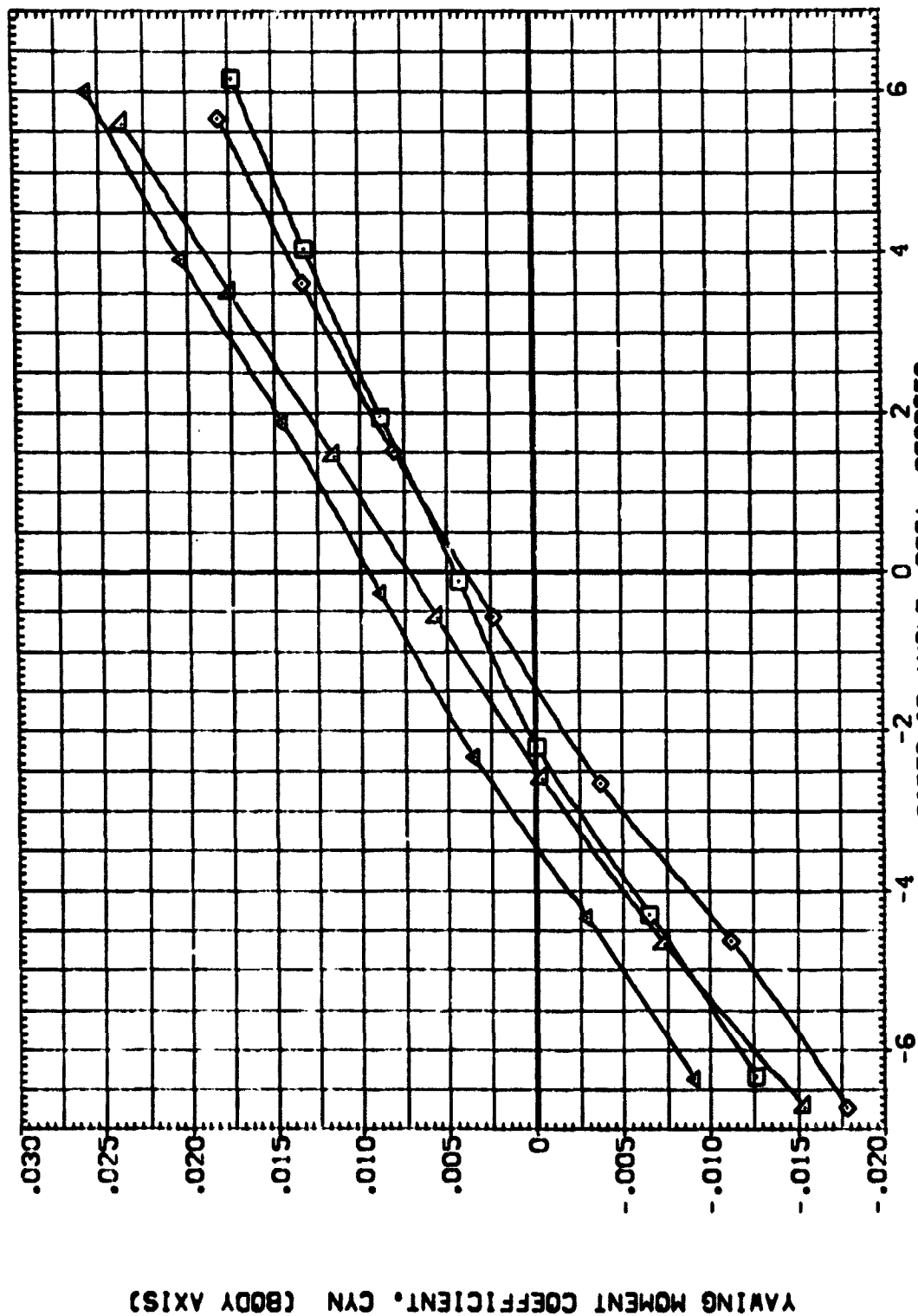


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(F)MACH = 1.05

DATA SET SINGL. CONFIGURATION DESCRIPTION  
 [RE-2008] DATA NOT AVAILABLE  
 [RE-2009] DATA NOT AVAILABLE  
 [RE-2010] DATA NOT AVAILABLE  
 [RE-2011] DATA NOT AVAILABLE  
 [RE-2012] DATA NOT AVAILABLE

LAMDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 5.000  
 60.000 5.000

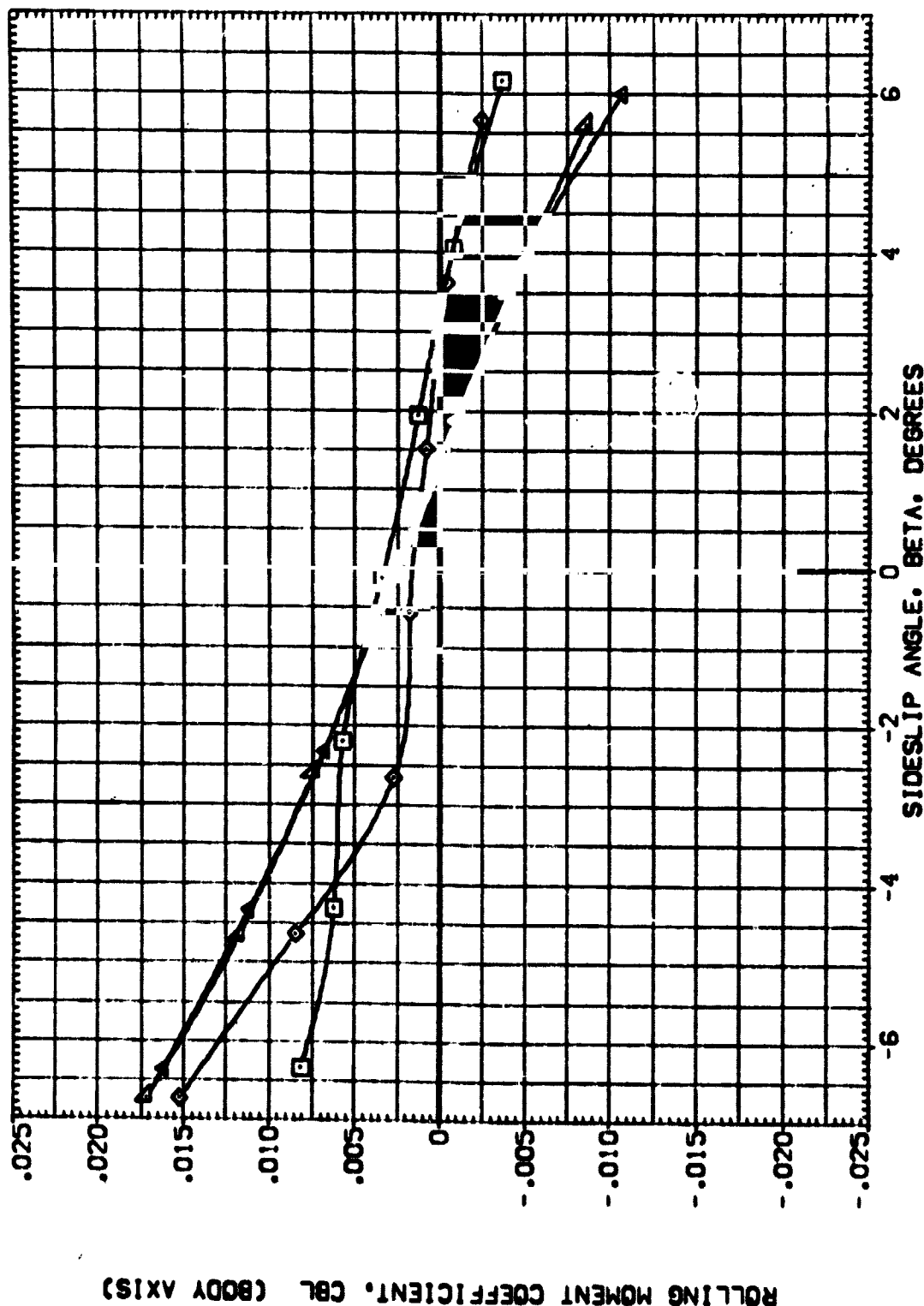


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDSLIP- 12-PERCENT-THICK WING.

(F)MACH = 1.05



DATA SET SYMBOL CONFIGURATIC. DESCRIPTION  
 (REF. 1008) DATA NOT AVAILABLE  
 (REF. 1009) VS B2  
 (REF. 1010) VS B2  
 (REF. 1011) VS B2  
 (REF. 1012) VS B2

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

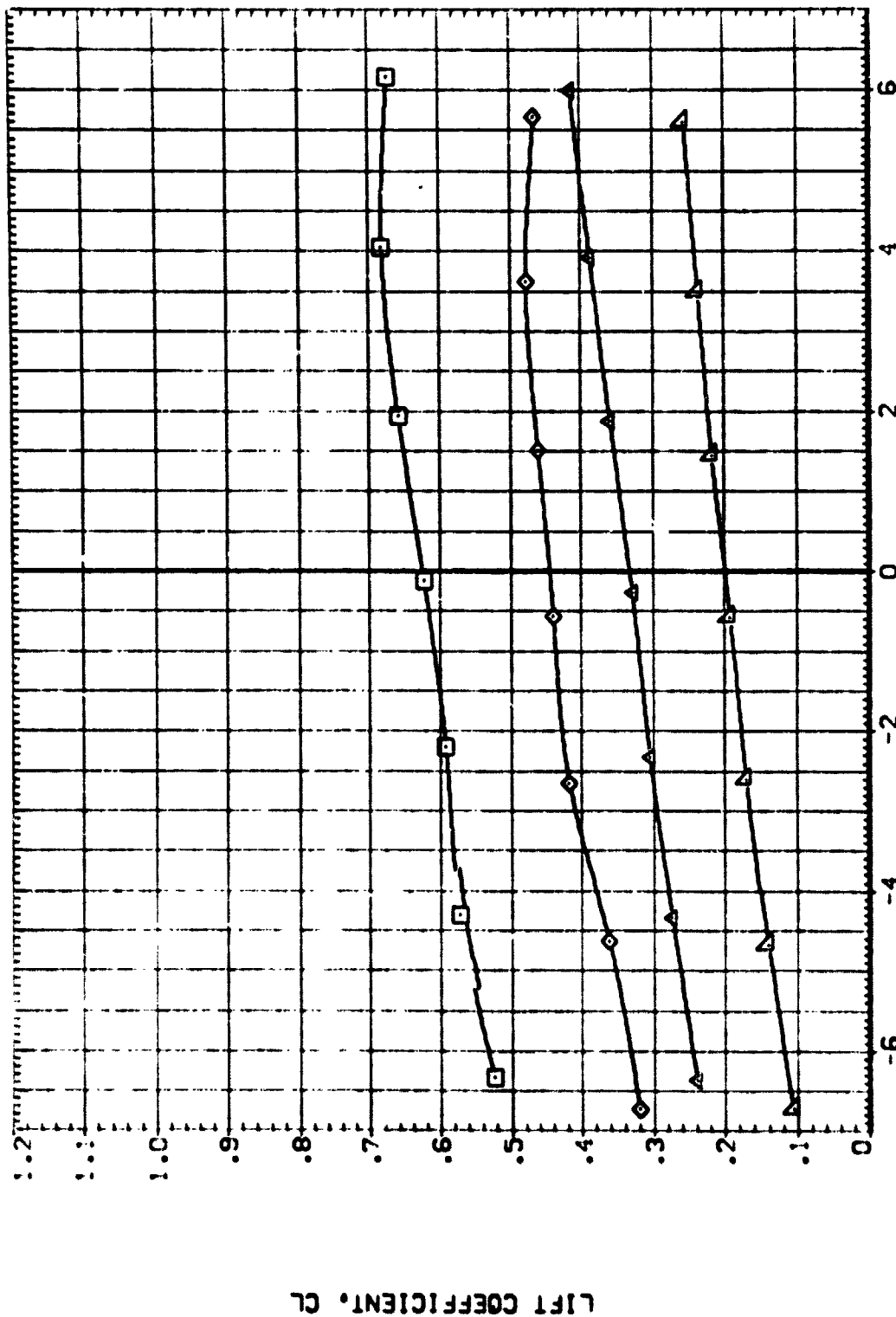


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(F)MACH = 1.05

DATA SET SYMBOL: 081  
 CONFIGURATION: AVAILABLE  
 [#1008] VS B2  
 [#1009] VS B2  
 [#1010] VS B2  
 [#1011] VS B2  
 [#1012] VS B2

LAMDA ALPHA  
 0.000 5.000  
 45.000 5.000  
 45.000 5.000  
 60.000 5.000  
 60.000 5.000

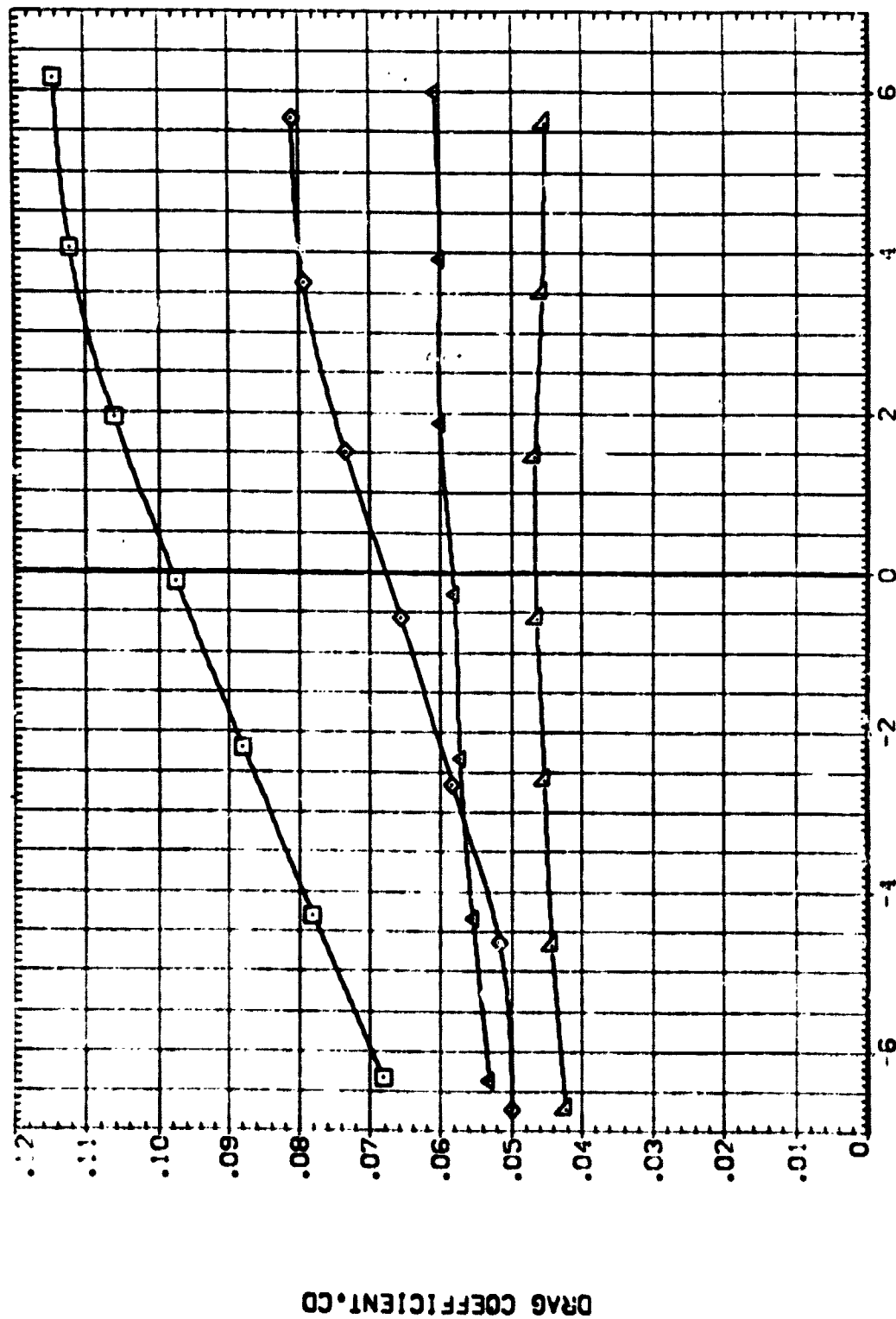


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(F)MAC = 1.05

DATA SET SYNO. C31 CONFIGURATION DESCRIPTION  
 (REF 1008) Q AVAILABLE  
 (REF 1009) -5 B2  
 (REF 1010) -5 B2  
 (REF 1011) -5 B2  
 (REF 1012) -5 B2

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

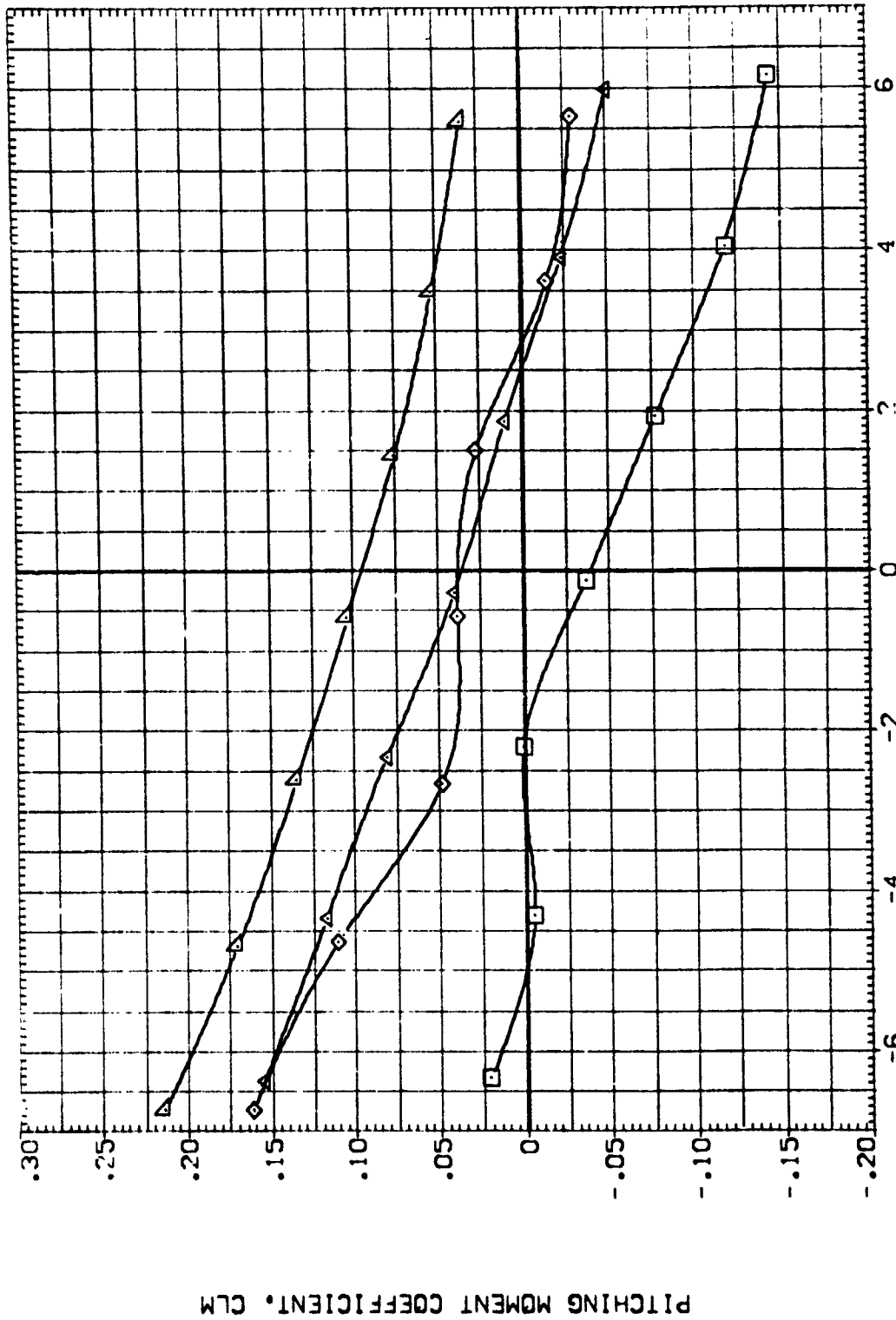


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(C)MACH = 1.05

DATA SET SYMBOL. C. LOCATION DESCRIPTION  
 [RE:008] □ DATA BY AVAILABLE  
 [RE:009] ◇ VS B2  
 [RE:010] △ VS B2  
 [RE:011] △ VS B2  
 [RE:012] △ VS B2

LAMBDA ALPHA  
 0.000 5.000  
 45.000 5.000  
 45.000 5.000  
 60.000 5.000

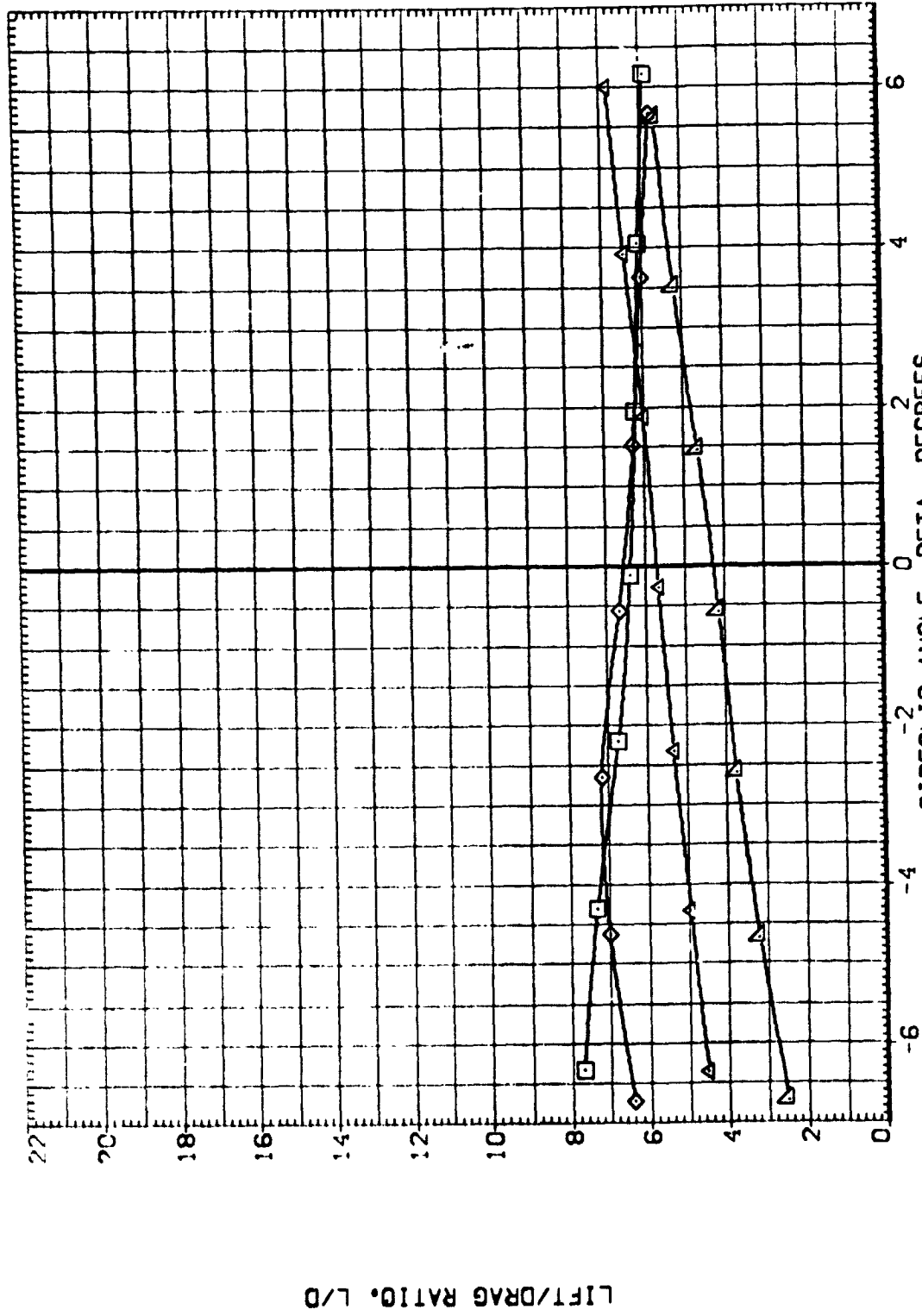


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(F)MACH = 1.05

DATA SET SYMB. CONFIGURATION DESCRIPTION  
 (R:000) DATA NOT AVAILABLE  
 (R:000) DATA NOT AVAILABLE  
 (R:010) DATA NOT AVAILABLE  
 (R:011) DATA NOT AVAILABLE  
 (R:012) DATA NOT AVAILABLE  
 15 32 1

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

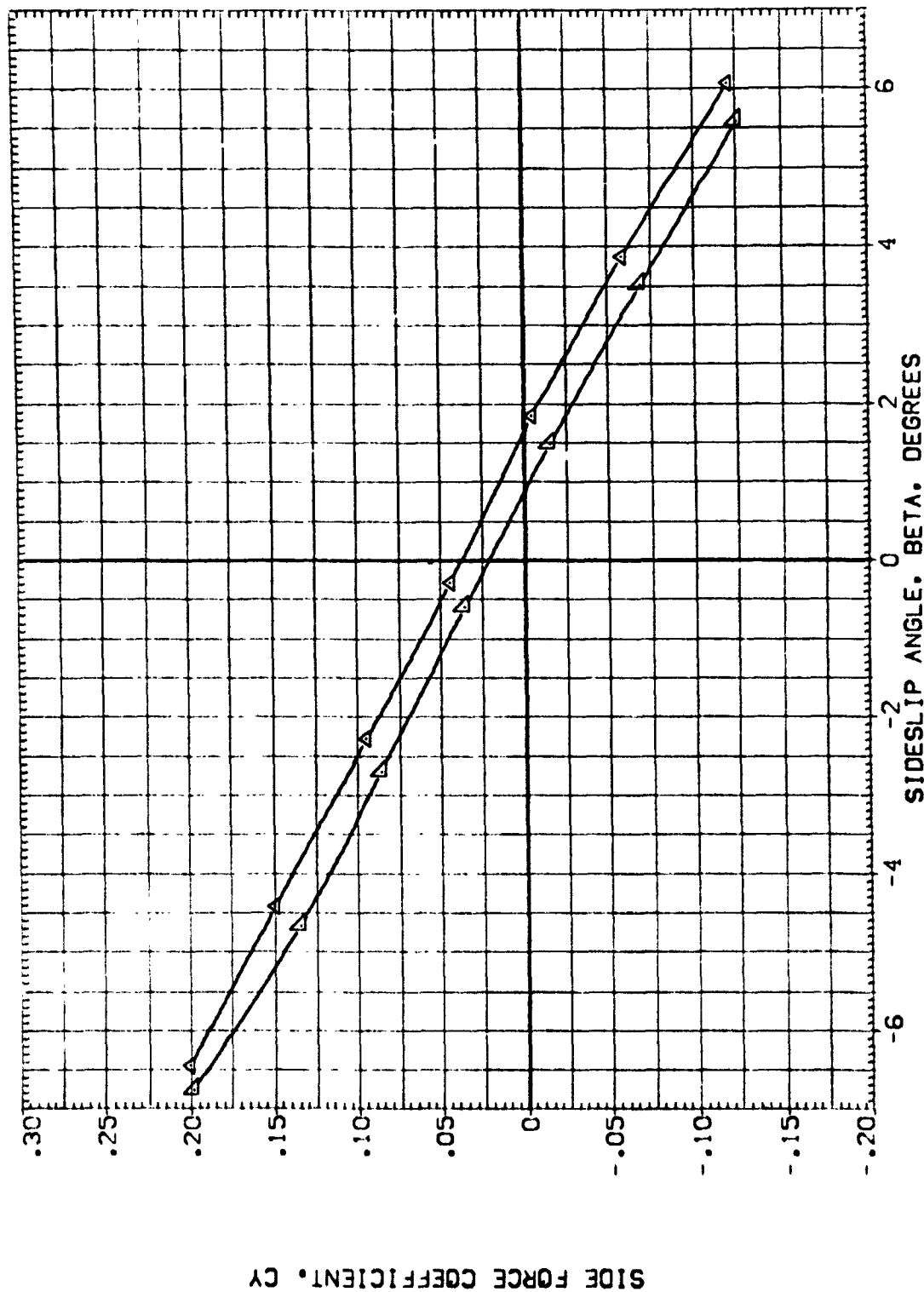


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(G)MACH = 1.10

DATA SET SYMBOL: 510 RATIO DESCRIPTION:  
 (REF:008) Q DATA NOT AVAILABLE  
 (REF:009) Z DATA NOT AVAILABLE  
 (REF:010) Z DATA NOT AVAILABLE  
 (REF:011) Z DATA NOT AVAILABLE  
 (REF:012) Z DATA NOT AVAILABLE

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

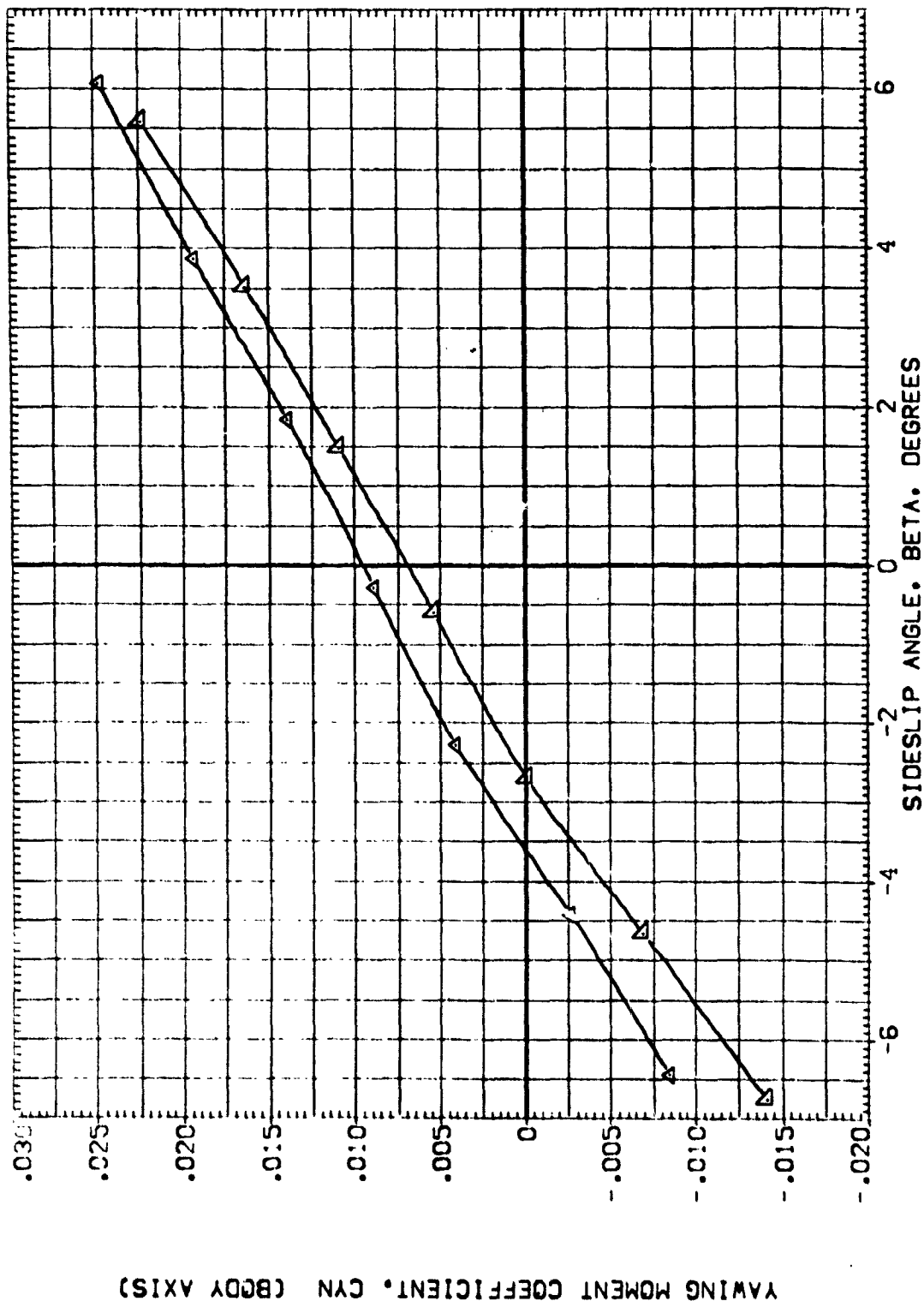


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(G)MACH = 1.10

DATA SET SYMBOL. CONFIGURATION DESCRIPTION  
 [RE:008] DATA NOT AVAILABLE  
 [RE:009] DATA NOT AVAILABLE  
 [RE:010] DATA NOT AVAILABLE  
 [RE:011] VS B2  
 [RE:012] VS B2

LAMBDA ALPHA  
 .000 5.000  
 .45.000 5.000  
 .45.000 3.000  
 .60.000 3.000

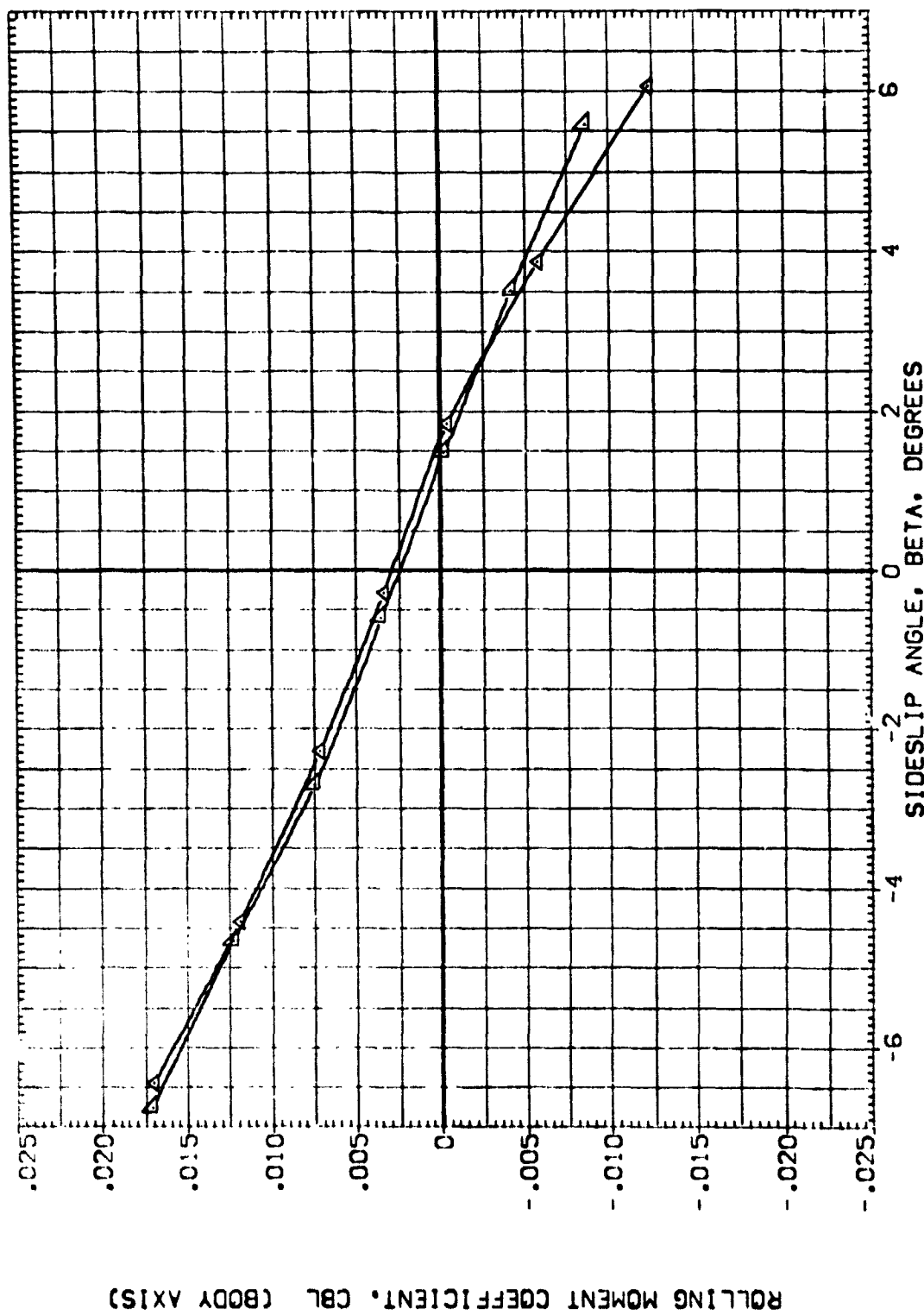


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(G)MAC = 1.10

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RE-008] DATA NOT AVAILABLE  
 [RE-009] DATA NOT AVAILABLE  
 [RE-010] DATA NOT AVAILABLE  
 [RE-011] DATA NOT AVAILABLE  
 [RE-012] DATA NOT AVAILABLE

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 60.000 5.000  
 60.000 3.000

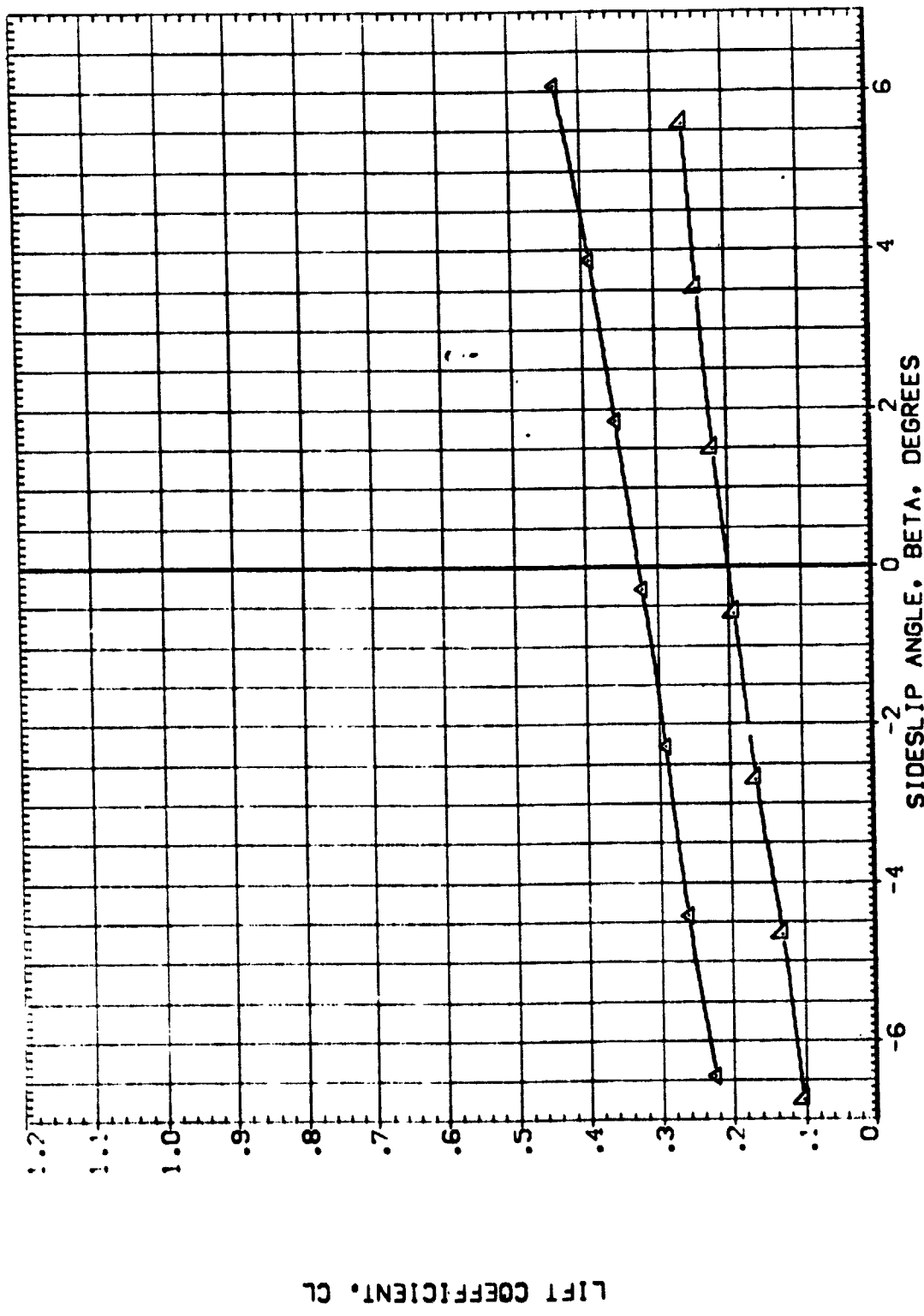


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(S)MAC = 1.10



DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [X:008] DATA NOT AVAILABLE  
 [X:009] DATA NOT AVAILABLE  
 [X:010] DATA NOT AVAILABLE  
 [X:011] DATA NOT AVAILABLE  
 [X:012] DATA NOT AVAILABLE

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 60.000 5.000  
 60.000 3.000

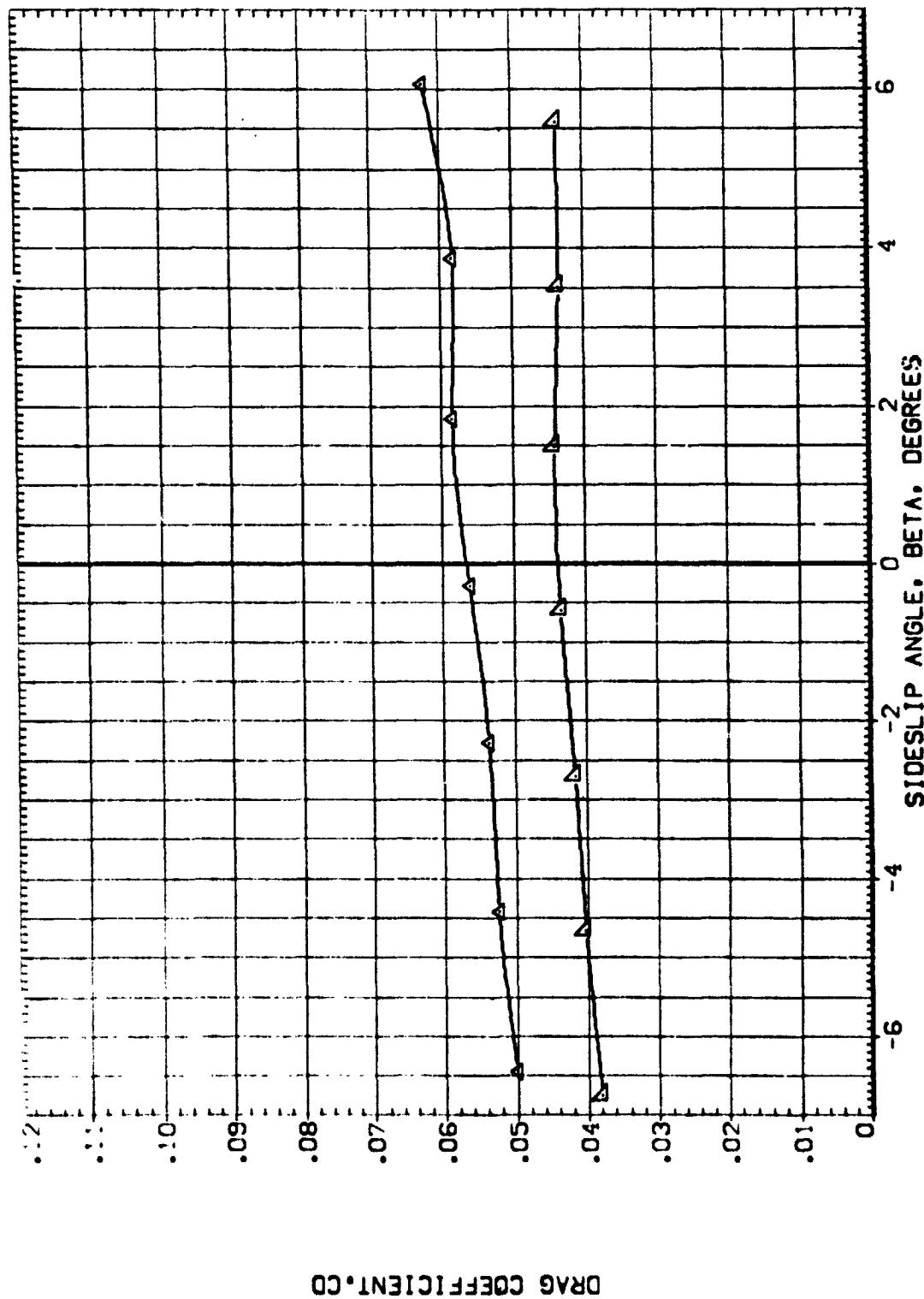


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(G) VACH = 1.10

LAMBDA	ALPHA
.000	5.000
45.000	5.000
45.000	3.000
60.000	5.000
60.000	3.000

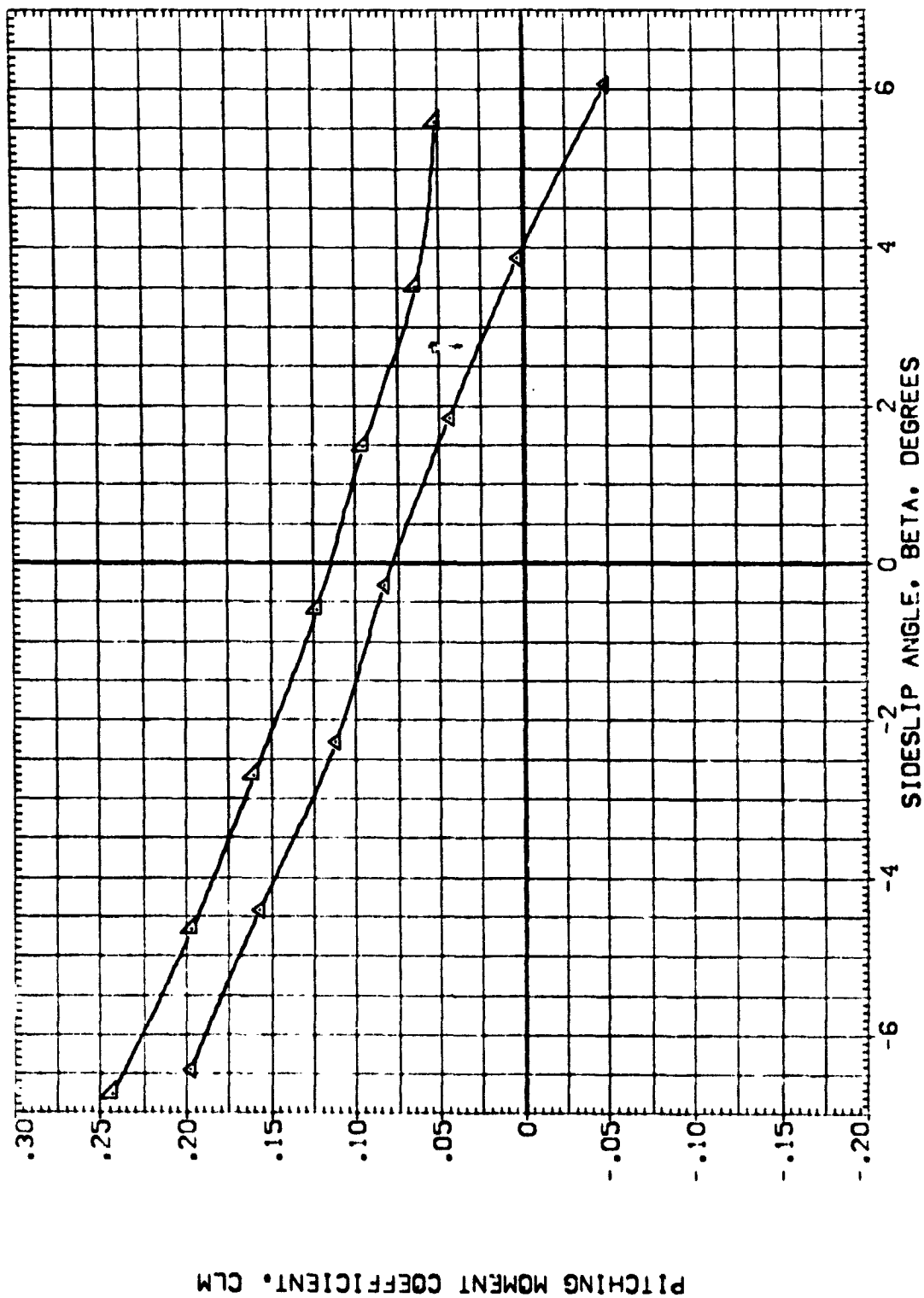


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

$$[G]^{wACh} = 1.10$$

DATA SET SYMBO. CONFIGURATION DESCRIPTION  
 (RF-4009) DATA NOT AVAILABLE  
 (RF-4009) DATA NOT AVAILABLE  
 (RF-4010) DATA NOT AVAILABLE  
 (RF-4011) VS B2 T  
 (RF-4012) VS B2 T

LAMDA ALPHA  
 .000 5.000  
 45.000 5.000  
 60.000 5.000  
 60.000 3.000

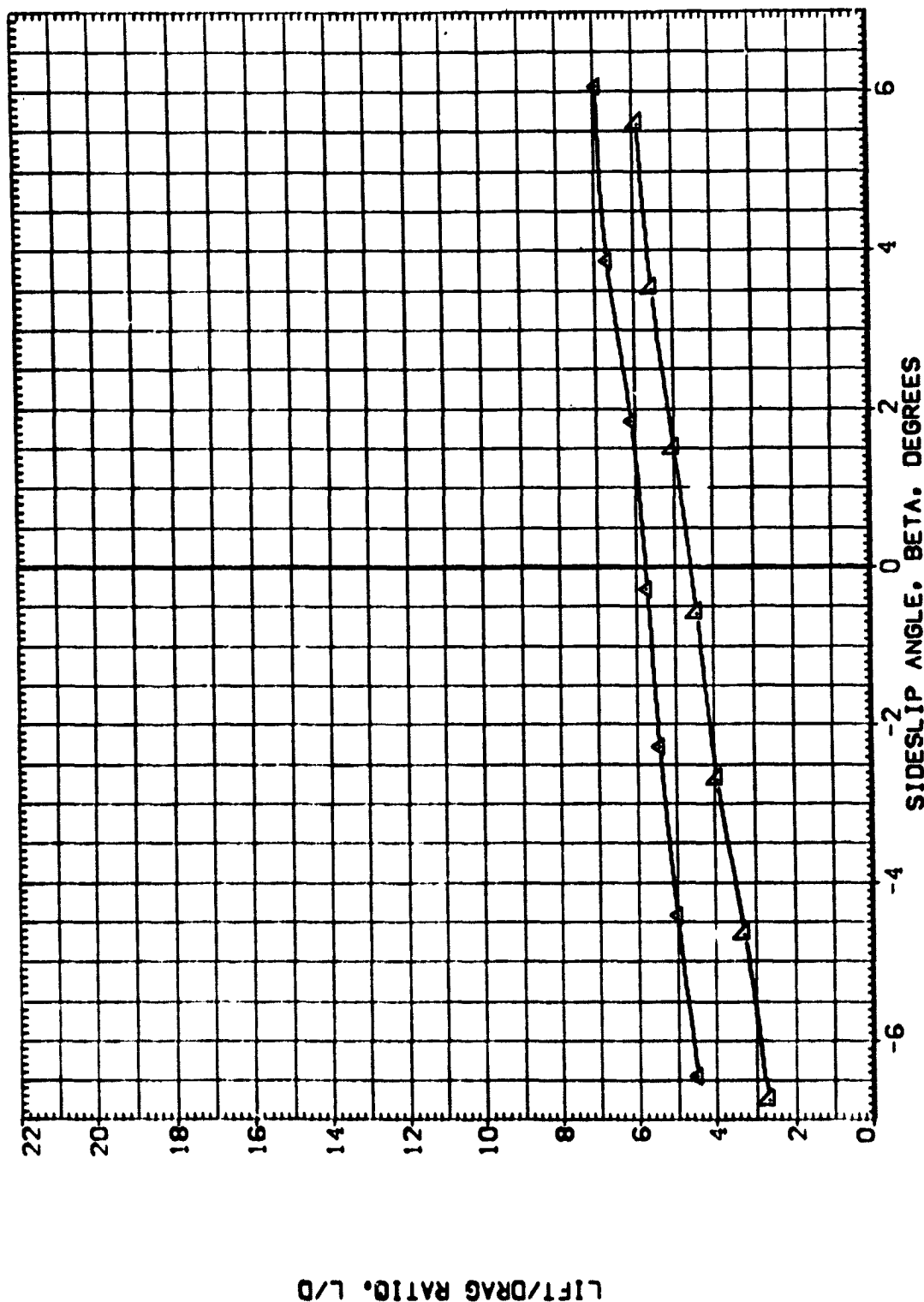


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(G)MACH = 1.10

DATA SET SYMBOL    CONFIGURATION DESCRIPTION  
 [ # 1008 ]    DATA NOT AVAILABLE  
 [ # 1009 ]    DATA NOT AVAILABLE  
 [ # 1010 ]    DATA NOT AVAILABLE  
 [ # 1011 ]    VS 82 T  
 [ # 1012 ]    VS 82 T

LAMBDA    ALPHA  
 .000    3.000  
 45.000    3.000  
 45.000    3.000  
 80.000    3.000

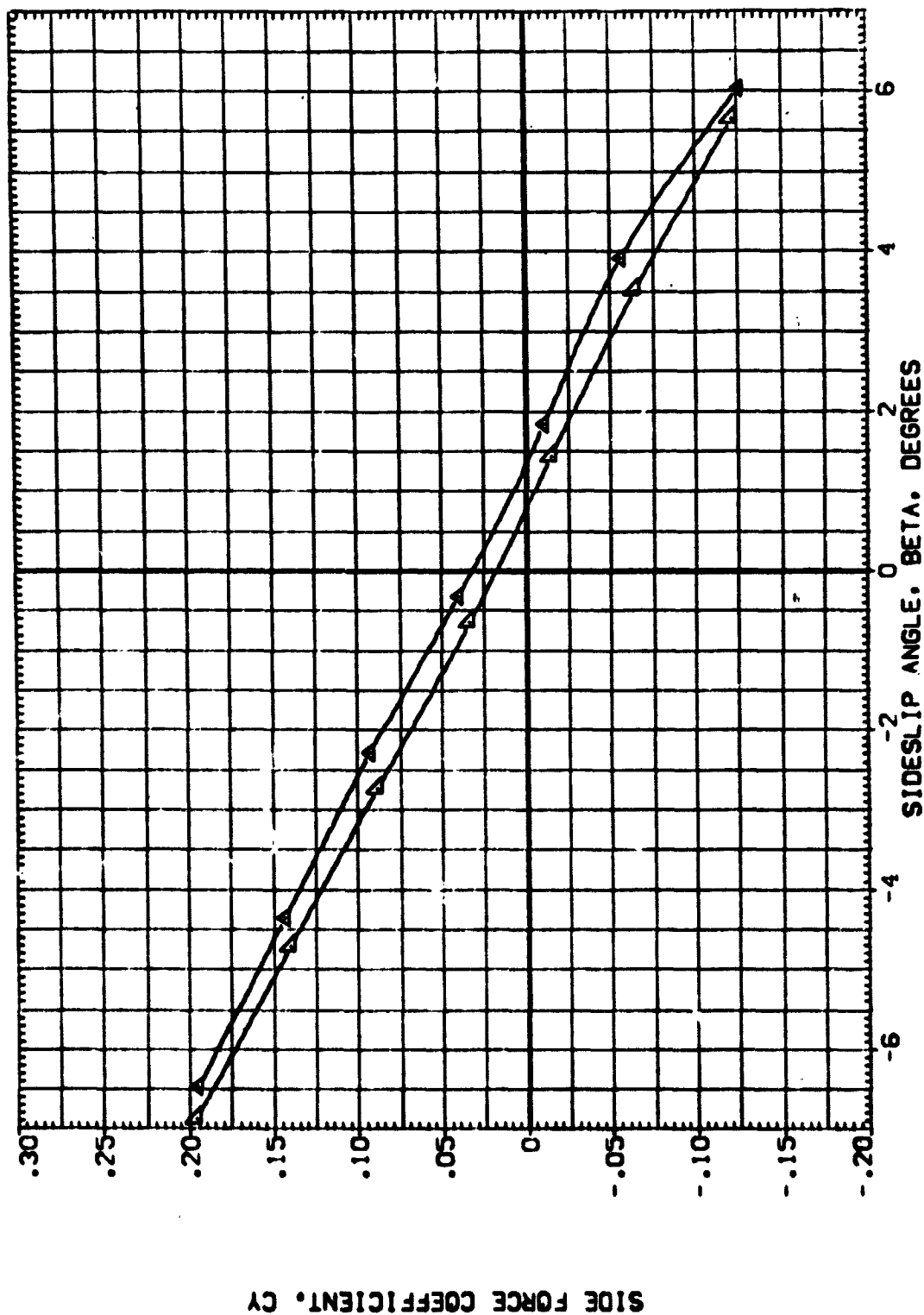


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.  
 (H)MACH = 1.20    PAGE 120

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [REF:008] Q DATA NOT AVAILABLE  
 [REF:009] X DATA NOT AVAILABLE  
 [REF:010] Y DATA NOT AVAILABLE  
 [REF:011] VS B2  
 [REF:012] VS B2

LAMDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

YAWING MOMENT COEFFICIENT, CYN (BODY AXIS)

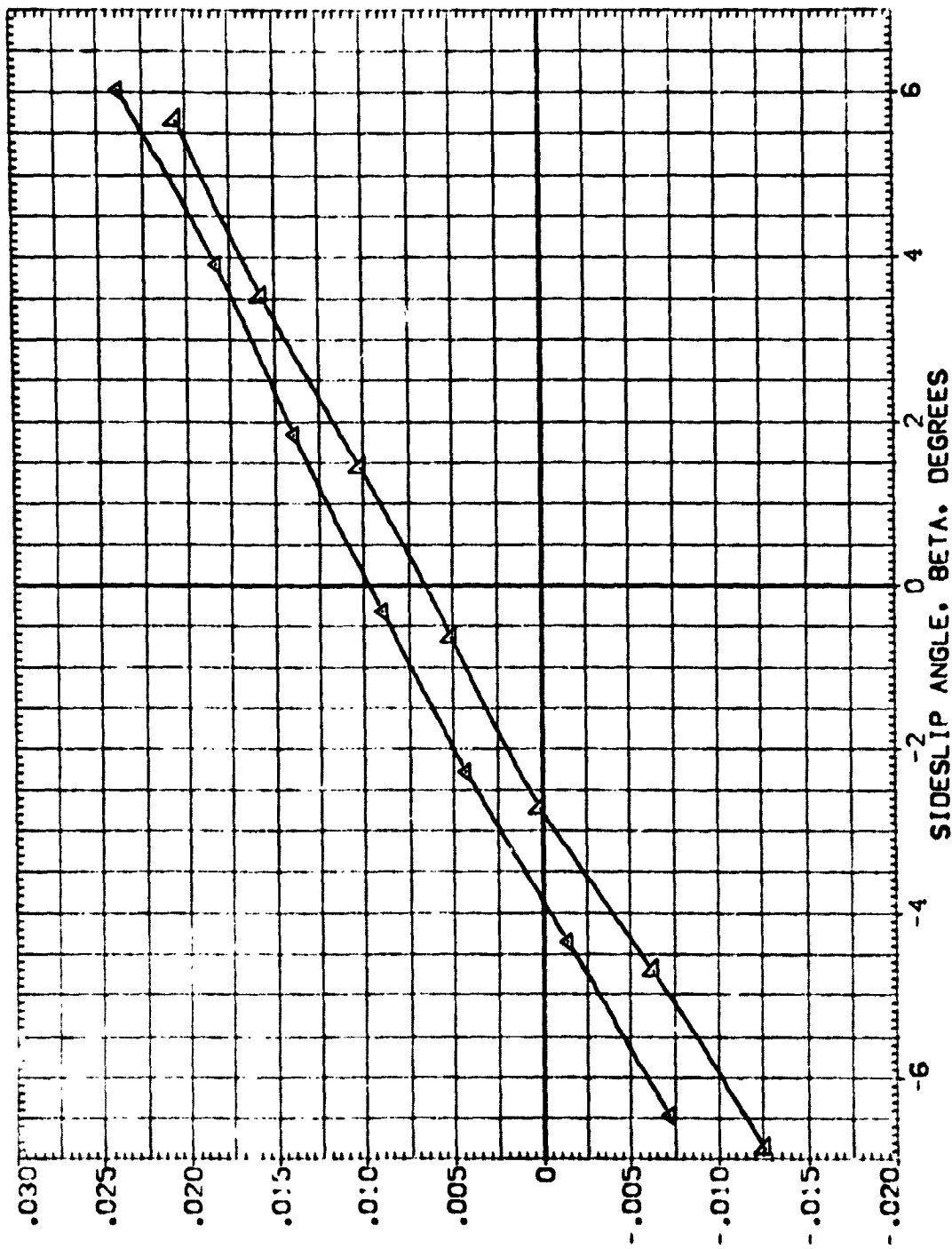


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.  
 (M) VACH = 1.20

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RE-008] DATA NOT AVAILABLE  
 [RE-009] DATA NOT AVAILABLE  
 [RE-010] DATA NOT AVAILABLE  
 [RE-011] VS 82  
 [RE-012] VS 82

LAMBDA ALPHA  
 .000 5.000  
 45.000 5.000  
 45.000 5.000  
 60.000 5.000

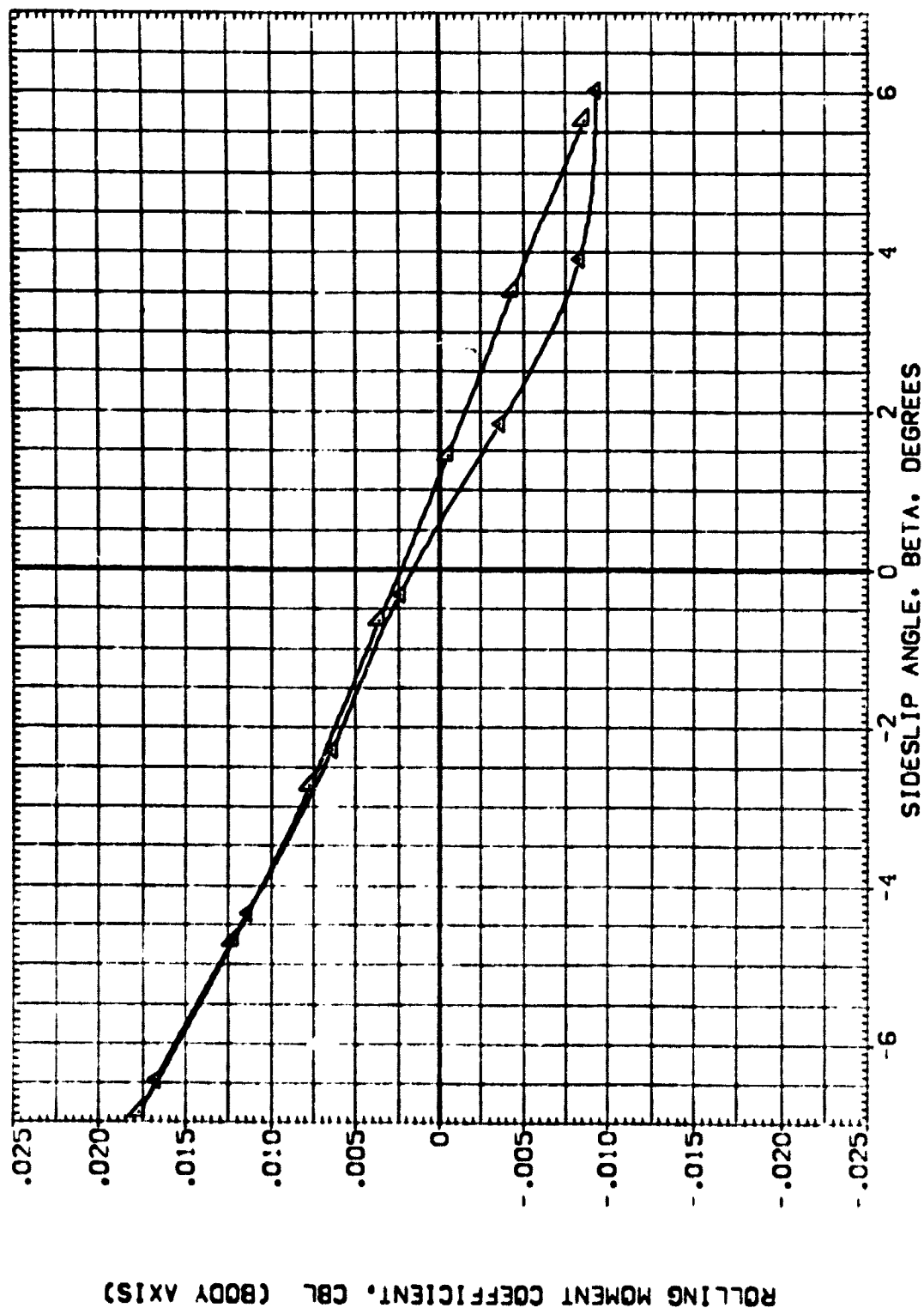


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(M) VACH = 1.20

	ALPHA	LAMBDA
000000	000000	000000
553333	454560	454560
	606060	606060
	333333	505050
	000000	000000



**PAGE 123**

LAMBDA	ALPHA
5.000	5.000
15.000	5.000
45.000	3.000
60.000	5.000
65.000	3.000



**PAGE 124**



DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (R-1008) DATA NOT AVAILABLE  
 (R-1009) DATA NOT AVAILABLE  
 (R-1010) DATA NOT AVAILABLE  
 (R-1011) \*S BZ 1  
 (R-1012) \*S BZ 1

LAMBDA ALPHA  
 .000 5.000  
 .45 .000 5.000  
 .45 .000 3.000  
 .60 .000 3.000

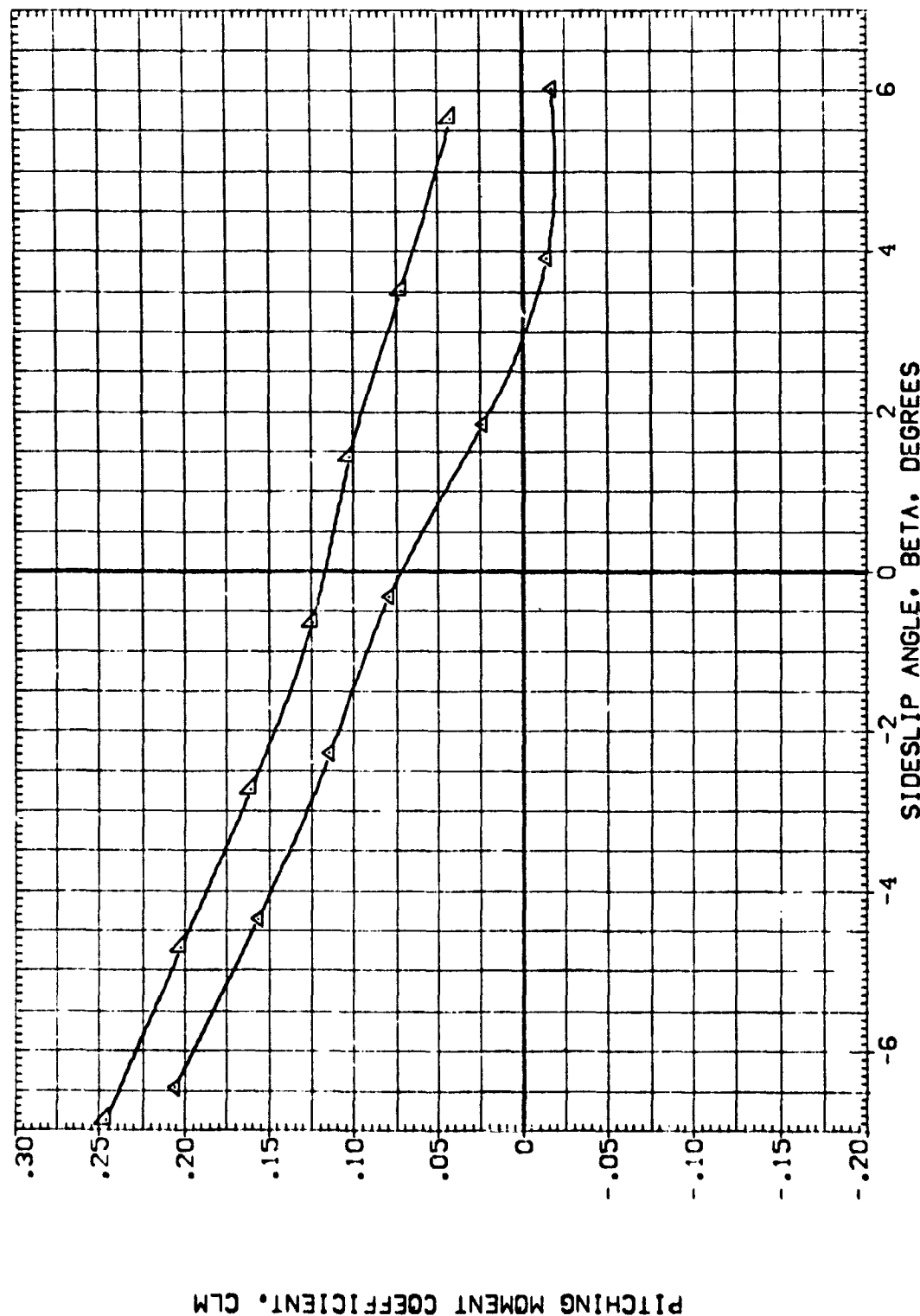


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(H)MACH = 1.20

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 [RF1008] DATA NOT AVAILABLE  
 [RF1009] DATA NOT AVAILABLE  
 [RF1010] DATA NOT AVAILABLE  
 [RF1011] VS B2 T  
 [RF1012] VS B2 T

LAMBDA ALPHA  
 0.00 5.000  
 45.000 5.000  
 45.000 3.000  
 60.000 5.000  
 60.000 3.000

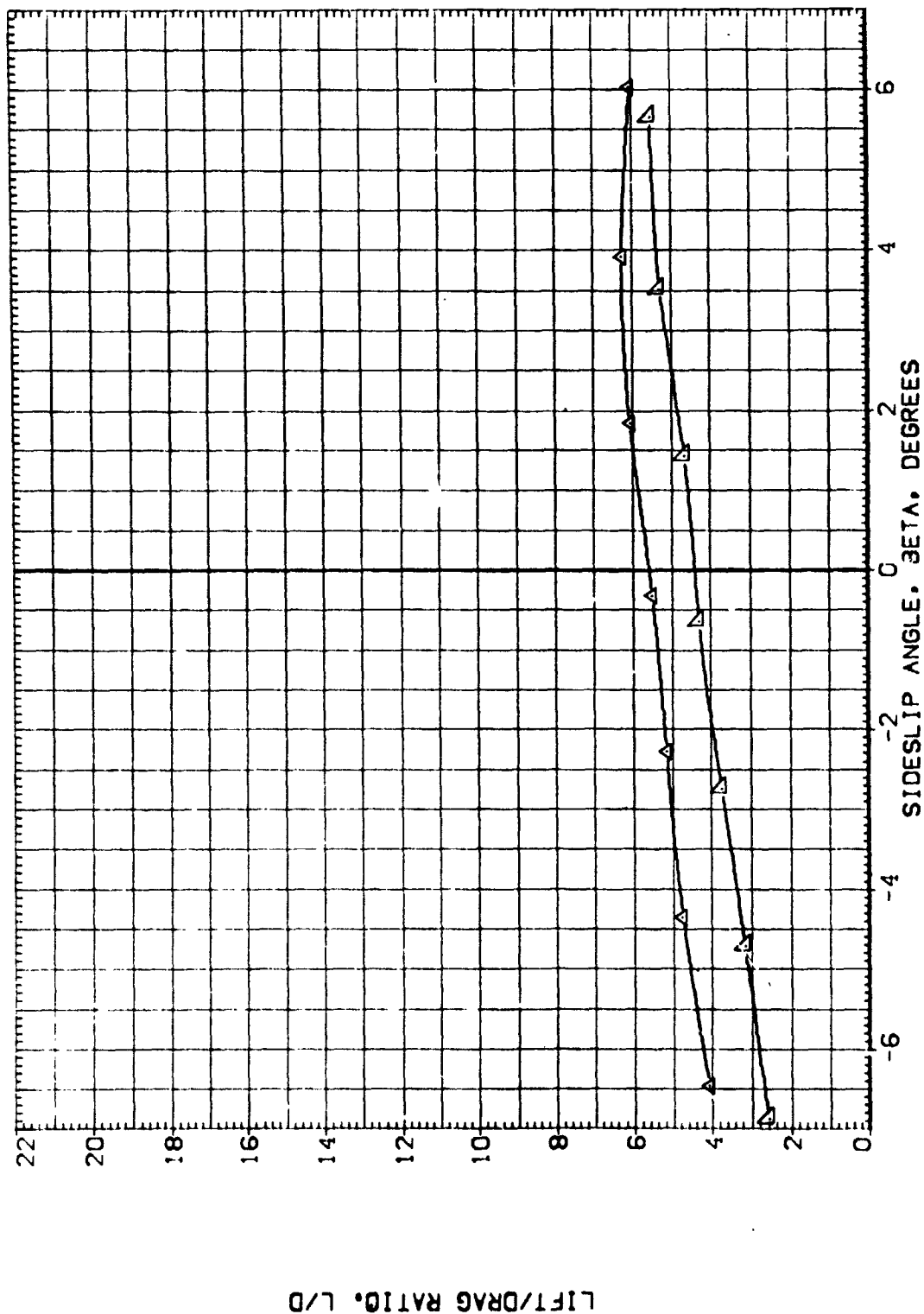


FIGURE 6. AERODYNAMIC CHARACTERISTICS IN SIDESLIP- 12-PERCENT-THICK WING.

(M)MACH = 1.20